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**Actualising Therapy 2.0: Enhancing Engagement with Computerised Cognitive
Behavioural Therapy for Common Mental Health Disorders**

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Thesis submitted for the degree of Doctor of Philosophy in Psychology

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Declaration

I hereby declare that this thesis has not been and will not be, submitted in whole or in part to another University for the award of any other degree.

Signature: Rebecca Grist.

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UNIVERSITY OF SUSSEX

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**ACTUALISING THERAPY 2.0: ENHANCING ENGAGEMENT WITH
COMPUTERISED COGNITIVE BEHAVIOURAL THERAPY FOR COMMON
MENTAL HEALTH DISORDERS****SUMMARY**

Computerised cognitive behavioural therapy (CCBT) is a clinically effective method of delivering CBT which may help address the under – treatment of common mental health disorders (CMHDs) in the population. However, concerns regarding acceptability, attrition rates and the therapeutic alliance are obstacles to widespread population dissemination. This thesis aimed to address these implementation issues by applying concepts from human – computer interaction (HCI) and attachment theory to the field of CCBT.

Chapter 1 presents a meta – analysis investigating the effectiveness of CCBT for CMHDs and moderators of this effect. Chapter 2 presents a systematic review and analysis conducted to examine predictors of CCBT engagement. A process – based model of engagement with CCBT developed from the findings of this review is also presented.

Adult attachment is known to influence engagement and alliance in face to face therapies, but research has not explored whether these relationships are mirrored in CCBT. Four empirical studies intended to address this question.

Study 1 used a student population based survey to explore the acceptability of CCBT in a student population and the associations with adult attachment. Results demonstrated adult attachment was not associated with acceptability of CCBT.

Study 2a utilised an open trial of a supported CCBT program to investigate whether adult attachment would predict engagement and alliance in vivo. Results showed attachment did not predict these outcomes. Study 2b utilised an open trial with a non – supported online CCBT program. Results indicated attachment security was positively associated with

program engagement and alliance. It is proposed a combination of attachment system activation and perceiving computers as social actors account for these findings. Study 3 used a randomised, experimental paradigm to test the benefits of security priming in CCBT. Security priming produced higher levels of program engagement and better working alliance compared to neutral primes. Furthermore these effects were not moderated by dispositional attachment styles.

These results demonstrate something so uniquely human, dispositional attachment orientations, founded on the intimate bonds we form in infancy and in adulthood , extend their influence into the experience of unguided CCBT, a solely human – computer interaction. Unguided – CCBT, a highly cost effective intervention with the potential for considerable public health impact, may benefit from incorporating security priming techniques in program designs to maximise engagement and alliance. Engagement and alliance is attainable in CCBT and paying attention to the attachment styles of program users may present a distinctive opportunity to overcome these implementation barriers.

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Chapter 1: Introduction

1.1. Common Mental Health Disorders

Depression and anxiety disorders affect nearly 6 million of the UK adult population (Office for National Statistics [ONS] 2000) and depression alone is among the largest single causes of disability worldwide (World Health Organisation, [WHO], 2013). These serious conditions are so prevalent, they have been conceptualised as ‘common mental health disorders’ or ‘CMHDs’ (National Institute for Health and Clinical Excellence, [NICE], 2011a). According to NICE guidelines (2011a), CMHDs comprise; depression (including sub – threshold disorders) and anxiety disorders such as social anxiety disorder, generalised anxiety disorder (GAD) panic disorder, obsessive – compulsive disorder (OCD) and post – traumatic stress disorder (PTSD).

Diagnosis of depression

Depression is considered a broad and heterogeneous diagnosis, central to which is a deficiency of positive affect, depressed mood state and a range of associated cognitive, behavioural, emotional and physical symptoms (NICE, 2009a). The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM – 5, American Psychiatric Association [APA], 2013) specifies Major Depressive Disorder (MDD) as a depressive disorder characterised by a single or recurrent Major Depressive Episode (MDE; APA, 2013). A MDE is diagnosed if an individual has, for a minimum of two weeks, experienced at least five out of the following nine symptoms; Depressed mood most of the day, noticeably reduced interest or pleasure in almost all activities, significant weight changes, insomnia or hypersomnia, physical agitation or slowness, fatigue or loss of energy, negative

feelings towards oneself including feelings of worthlessness or excessive guilt, impaired ability to concentrate and persistent thoughts of death and suicide. Of these criteria at least one key symptom of either low mood or loss of interest/pleasure must be present (APA, 2013). It has been noted that the distinguishing mood changes between clinically significant degrees of depression (as in MDD) and those occurring ‘normally’ continue to be problematic and so it is best to think of depressive symptoms as occurring on a continuum of severity (NICE, 2009a; Lewinsohn, Solomon, Seely & Zeiss, 2000). For diagnostic purposes the severity of the disorder is ascertained by the number of symptoms, symptom severity and functional impairment to social, occupational and other areas of life (NICE, 2009a). Severity of depression may range from; sub threshold depressive symptoms (less than five symptoms of depression), mild depression (few symptoms in excess of five required to meet diagnosis and minor functional impairment), moderate depression (symptoms or functional impairment are between ‘mild’ and ‘severe’) and severe depression (majority of symptoms which produce significant functional impairment; NICE, 2009a). NICE guidance on management of depression in adults also recognises sub – threshold depressive symptoms¹ can be both distressing and disabling when persistent.

Diagnosis of anxiety disorders

Generalised anxiety disorder. GAD is one of the most common anxiety disorders and is characterised by excessive and uncontrollable worry (NICE 2011b). Clinical diagnosis requires the presence of two key symptoms (excessive anxiety and worry about a number of events/activities, and difficulty controlling the worry) and three or more of the following; Restlessness or feeling on edge, easily fatigued, difficulty concentrating,

¹ The rest of this thesis will refer to “depression” as a generic term covering MDD, sub – threshold depressive symptoms and persistent depressive disorder. Individual terms will be made explicit where required.

irritability, muscle tension and sleep disturbance (DSM – 5; APA, 2013). Symptoms should be present more days than not for six months and cause significant distress and impairment in social and occupational functioning (NICE, 2011b). Somatic symptoms of GAD can present in various different ways, an over active autonomous nervous system, for example, can produce sweating, heart palpitations and dry mouth (Gelder, Harrision & Cowen, 2006).

Social anxiety disorder. Social anxiety disorder is defined as a persistent fear of being viewed negatively by others or humiliated in social and/or performance situations (Mental Health Foundation, 2007). Feared social situations are avoided. Where exposure to feared situations occurs they are endured with great anxiety and invariably lead to panic attacks (DSM – 5, APA, 2013). The sufferer is aware that their anxiety is excessive or unreasonable however the anxiety and avoidance behaviours significantly interfere with their everyday social, occupational and relational functioning (DSM – 5, APA, 2013). In Europe, lifetime prevalence rates of social anxiety disorder are approximately 6.7% (range 3.9% - 13.7%; Fehm, Péliissolo, Furmark & Wittchen, 2005) and in the US lifetime prevalence rates are around 12% (Kessler et al., 2005).

Obsessive compulsive disorder. OCD is another common anxiety disorder and is characterised by either obsessive thinking or compulsive behaviours, but commonly presents as both. Obsessions are defined as unwanted, intrusive thoughts, images or urges that enter the person's mind repeatedly. Compulsions are defined as repetitive, ritualised behaviours or mental acts that the individual feels compelled to perform, typically as a consequence of their obsessive thoughts (NICE, 2005a). It has been estimated that 2 – 3% of people will experience OCD in their lifetime (NICE, 2005a) and that 7% of British adults have reported experiencing 'obsessions' in any given week, with 4% reporting 'compulsions' (Singleton, Bumpstead, O'Brien, Lee & Meltzer, 2001).

Post-traumatic stress disorder. PTSD develops after a stressful situation or event which is particularly catastrophic or threatening in nature (NICE, 2005b). The most prominent symptom of PTSD is a vivid and involuntary re – experiencing of the traumatic event. This tends to take the form of flashbacks, nightmares, distressing intrusive images and other sensory impressions related to the traumatic event (NICE, 2005b). Other major PTSD symptoms include avoidance of reminders of the trauma, hyperarousal and hypervigilance to threat, sleep disturbances and emotional numbing. Symptoms of PTSD tend to surface immediately after the traumatic event however in around 15% of cases the onset of symptoms may be delayed (NICE, 2005b).

Panic disorder. Panic disorder is characterised by the presence of recurring, often unforeseen panic attacks, followed by persistent worrying about experiencing another panic attack (for at least one month following the first attack) and concern about the consequences of having an attack, such as worrying about losing control or having a heart attack (DSM -5, APA, 2013). Formal diagnosis requires a minimum of two unexpected panic attacks, not accounted for by substance use, a medical condition or another psychological condition (DSM – 5, APA, 2013).

Prevalence of common mental health disorders

It has been estimated that CMHDs may affect up to 15% of the population at any given time (NICE, 2011a). Prevalence of individual CMHDs vary. One week prevalence rates have been reported as 4.4% for GAD, 3.0% for PTSD, 2.3% for depression, 1.4% for phobias, 1.1% for OCD and 1.1% for panic disorder (The NHS Information Centre for Health and Social Care, 2007). Furthermore, over half of people aged 16 to 64 years who meet the diagnostic criteria for at least one CMHD experience comorbid depression and anxiety disorders (NICE, 2011a). The UK has the highest prevalence of all CMHDs in

Europe (King et al., 2008). Depression accounts for 4.3% of the global burden of disease and is one of the largest causes of disability worldwide (WHO, 2013). Depression was ranked the fourth most common cause of disability in 1990 and is expected to become the second most common cause by 2020 (World Bank, 1993). By 2030, depression is projected to be the single largest burden of disability and ill health accounting for 6.2% of disability adjusted life years (DALYs²) worldwide (WHO, 2004). Anxiety disorders also contribute to the global health issue of CMHDs. The estimated lifetime prevalence of any anxiety disorder is over 15% and prevalence rates of anxiety disorders are generally higher in developed countries than in developing countries (Kessler et al., 2009). In the United States, GAD is considered to be the most common cause of disability in the workplace (Ballenger et al., 2001).

Economic costs of common mental health disorders

CMHDs impose a substantial economic burden, both in terms of direct costs to services (costs of treatment, medications, costs of providing health and social care) and indirect costs (loss of work productivity and reliance on the state for welfare). The high prevalence of depression means the direct cost on services and the indirect costs of lost productivity are considerable. A review of mental health expenditure in England in 2007 revealed that 1.24 million people were living with depression, resulting in National Health Service (NHS) service costs of £1.68 billion, lost earning costs of £5.82 billion and reflected a total cost of £7.50 billion (McCrone, Dhanasiri, Patel, Knapp & Lawton – Smith, 2008). By 2026 the number of people suffering from depression in England is estimated to be 1.45 million with a total cost of £12.15 billion to the economy. The total annual cost of

² DALYs are defined as the sum of the years of potential life lost due to premature mortality and the years of productive life lost due to disability (WHO, 2004).

depression in Europe has been estimated at €118 billion in 2004 and corresponds to 1% of the total economy of Europe (GDP; Sobocki, Jönsson, Angst, & Rehnberg, 2006).

As with depression, the cost of anxiety disorders in England is high. The total number of people suffering an anxiety disorder was estimated to be 2.28 million in 2007 and this number is expected to rise to 2.56 million by 2026 (McCrone et al., 2008). The total cost for people who were in treatment, or at least had their disorder recognised, was £8.9 billion in 2007 and is projected to rise to £14.2 billion by 2026 (McCrone et al., 2008). There are few studies which provide reliable data on the cost of anxiety disorders in Europe. Of those that are available, one evaluation estimated excess costs of anxiety disorders range from €500 to €16,000 per case in 2004 (Andlin – Sobocki & Wittchen, 2005).

Personal costs of common mental health disorders

The personal cost of CMHDs are equally alarming as the economic burden described. Due to the cognitive and behavioural symptoms experienced by people with depression, many find it difficult to engage in social activities, which in turn negatively affect relationships and family life. Many also experience difficulty in communicating and sustaining relationships, producing long term impairments in social functioning (NICE, 2009a). People with MDD encounter disproportionately higher rates of disability and mortality. Those suffering from MDD have a 40% - 60% greater chance of dying prematurely than the general population because of unattended physical health problems and suicide (WHO, 2013). Figures suggest having depression produces a risk of suicide over four times higher than the general population (Bostwick & Pankratz, 2000). Furthermore, depression produces a larger deterioration in the state of one's health than major chronic physical illnesses; angina, arthritis, asthma and diabetes (Moussavi et al., 2007).

Similarly, anxiety disorders can cause significant distress. Anxiety disorders are associated with impairments in work functioning, making it difficult to sustain a job and impairments in social functioning make it difficult to maintain relationships. Anxiety disorders are often linked with physical health problems such as gastrointestinal problems, respiratory disorders and arthritis (Carter, Wittchen, Pfister & Kessler, 2001). Anxiety disorders are a significant risk factor for the development of substance abuse disorders and conversely, prolonged intoxication and withdrawal from various substances often produce symptoms of anxiety (Back & Brady, 2008).

Carer burden

Caregiver burden refers to the strain and difficulties experienced by a caregiver or family of a mentally ill individual and can include a range of psychological, emotional, social, physical and financial problems (Idstad, Ask, Tambs, 2010). In the last several decades there has been a substantial shift in the responsibility of care for people with mental health disorders, from institutionalised care in psychiatric hospitals to family caregivers in the community (Veltman, Cameron & Stewart, 2002). The World Health Organisation estimates one in four families contain at least one person with a mental health disorder, and family members are often the primary caregivers for these individuals (WHO, 2003). In England, it has been reported that 13% of carers are caring for someone with a mental health problem (The NHS Information Centre for Health and Social Care, 2010). Personal consequences of caregiving include increased feelings of stigma and social exclusion, deterioration of personal relationships and negative impacts on one's own mental health including increased risk of experiencing stress and depression (Ohaeri, 2003). A substantial amount of time is typically needed to care for someone with a mental health disorder and so caregiving also often means an impaired ability to work and a considerable

drop in income (Carers UK, 2012). Many carers therefore face debt and money worries with one report stating 4 out of 10 carers have been in debt as a result of caring and this figure is higher for caregivers of someone with a mental health condition (57 %; Carers UK, 2011). The burden of CMHDs therefore extends to informal caregivers who suffer both personal and financial impacts of caregiving for loved ones.

1.2. Treatments for common mental health disorders

It is evident that CMHDs represent a major challenge for national and global health systems as well as for the individuals and carers who suffer. Developing and disseminating effective treatments for CMHDs has therefore become a global priority (WHO, 2003; 2013). Broadly speaking, treatments for CMHDs fall under pharmacological or psychological approaches. The discovery of psychotropic agents in the 1950's and the study of their pharmacology has contributed much to the understanding of biological correlates of anxiety and mood disorders. The monoamine hypothesis states that affective disorders are associated with deficiencies in levels of the neurotransmitters noradrenaline, dopamine and serotonin (Wong & Licinio, 2011). As such, antidepressant medications primarily act by increasing the availability of these neurotransmitters in the brain. Similarly, the biological model of anxiety disorders hypothesises that anxiety is caused by abnormalities in GABA neurotransmission and that pharmacological agents targeting these abnormalities may alleviate anxiety symptoms (Nemeroff, 2003).

The psychological approach highlights the role of psychological factors in the development and maintenance of anxiety and mood disorders. Psychoanalytic theory, behaviourism and cognitive theory are three main areas of psychology which have

influenced contemporary psychological treatments for CMHDs currently available in NHS services. Each of these therapies will be introduced in turn.

Although treatments for CMHDs are based on biological or psychological approaches the current ideological status quo is a biopsychosocial approach (Engel, 1977; Ghaemi, 2009). This approach advocates a multifactorial methodology to understanding mental illness as reflective of interactions between biological, psychological and social factors.

Psychopharmacological treatments for common mental health disorders

Antidepressants. There are currently four major groups of antidepressant medications; monoamine oxidase inhibitors, tricyclic antidepressants, selective serotonin reuptake inhibitors and selective noradrenaline reuptake inhibitors. These pharmacological agents are a heterogeneous set of drugs which primarily act by enhancing the availability of monoamines at the synaptic cleft (Wong & Licinio, 2001). Appreciation of the pharmacology of these agents resulted in the monoamine hypothesis of depression (Wong & Licinio, 2001).

Monoamine oxidase inhibitors (MAOs). MAOs are compounds which inhibit the action of monoamine oxidase, an enzyme which catalyses the breakdown of the monoamines 5-hydroxytryptamine (5-HT, or serotonin), dopamine (DA) and noradrenaline (NE; Youdim, Edmondson & Tipton, 2006). MAOs mode of action is therefore to inhibit the breakdown of these neurotransmitters and thus increase their availability. The therapeutic benefit of MAOs was discovered by chance in the 1950's, after observing mood changes in patients undergoing iproniazid treatment for tuberculosis (Selikoff, Robitzek & Ornstein, 1952). Eventually, iproniazid became the first anti-depressant and the first antipsychotic to be used therapeutically (Youdim et al., 2006). Unfortunately, due to

adverse side effects of MAOs, such as negative interactions with other drugs, many MAOs, such as iproniazid were eventually removed from the market. The remaining MAOs continue in use as a second choice treatment for individuals for whom newer anti – depressants have not worked (López-Muñoz, Alamo, Juckel, & Assion, 2007).

Tricyclic antidepressants (TCAs). Tricyclic antidepressants are another older class of antidepressants. TCAs mode of action is to block the reuptake of 5 – HT and NE back into the synapse, thereby increasing the availability of these neurotransmitters in the synaptic cleft for binding with receptors (Lieberman, 2003). The first clinically effective TCA was imipramine, a drug developed using molecular modifications of the anti – psychotic drug chlorpromazine (Kuhn, 1958). Although TCAs were considered clinically beneficial and a major advancement in the treatment of depression, their continued use was impeded by significant toxicity and safety problems, negative side effects and dangerous drug interactions (Lieberman, 2003). Despite the development of better tolerated second generation TCAs (e.g. desipramine) they remain as a second choice of treatment behind a newer psychotropic anti-depressant; selective serotonin reuptake inhibitors.

Selective serotonin reuptake inhibitors (SSRIs). Selective serotonin reuptake inhibitors are a class of psychotropic drugs which specifically inhibit the reuptake of serotonin into the presynaptic terminal, thus leaving more 5 – HT in the synaptic cleft to bind with post synaptic receptors (Thompson, 2000). The first SSRI to be developed was fluoxetine, which was approved in 1987 by the FDA and introduced into the American market under the trade name Prozac ® (López-Muñoz & Alamo, 2009). SSRIs represent the first class of psychotropic drugs to be discovered using a procedure using rational and directed design (Preskorn, Ross & Stanga, 2004). Their improved safety and tolerability profile over TCAs and MAOs make SSRIs the world's most commonly prescribed

antidepressant and the most written about psychotropic medication (along with chlorpromazine) in the history of pharmacology (López-Muñoz & Alamo, 2009). In comparison to the 1950's – 1970's, SSRIs have made treatment for CMHDs in primary care the norm, rather than the exception and primary care physicians continue to be among the most frequent prescribers of SSRIs (Lieberman, 2003).

Serotonin – noradrenaline reuptake inhibitors (SNRIs). Serotonin and noradrenaline (also called norepinephrine) reuptake inhibitors work by blocking the presynaptic reuptake of serotonin and noradrenaline, subsequently increasing the levels of both of these neurotransmitters in the synaptic cleft (Deecher, et al., 2006). Venlafaxine (Effexor or Efexor) was the first SNRI to be developed and marketed by Wyath (now Pfizer) in 1993 (Holliday & Benfield, 1995). Venlafaxine is currently approved for the treatment of depression, GAD, social phobia, panic disorder and chronic pain syndromes (Deecher et al., 2006; Gutierrez, Stimmel & Aiso, 2003). Duloxetine (Cymbalta and Yentreve) is a second SNRI, developed and marketed by Eli Lilly which is currently approved for use in the treatment of depression and GAD (Müller, Schennach, Riedel, & Möller, 2008). It has been proposed that these newer, dual – action agents may be more effective in treating both the emotional and physical aspects of depression than medications such as SSRIs which act on a single monoamine (Heninger, Delgado, & Charney, 1996; Müller et al., 2008). Some evidence supports this, for example a pooled analysis of eight randomised, double – blind controlled trials comparing the efficacy of Venlafaxine with SSRIs demonstrated that Venlafaxine was associated with greater improvement than SSRIs (Stahl, Entsuah & Rudolph, 2002). Similarly a meta-analysis of 32 randomised trials demonstrated Venlafaxine was more effective than SSRIs (standardised effect size - 0.14, 95% CI -0.07, - 0.22), but not tricyclic antidepressants (Smith, Dempster, Glanville, Freemantle &

Anderson, 2002). SSRIs still remain the most commonly prescribed antidepressant medication (NICE, 2011a), although how this will change as SNRIs and newer generation medications are developed remains to be seen.

Effectiveness of antidepressants. Antidepressant medications are typically evidenced to be effective at reducing symptoms of depression and/or anxiety (Bollini, Pampallona, Tibaldi, Kupelnick & Munizza, 1999). However, substantial issues with antidepressants remain a concern. For example, reviews have shown that the greater the baseline symptom severity, the larger the difference favouring antidepressants over placebo controls (Fournier et al., 2010; Kirsch, et al., 2008; Khan, Leventhal, Khan & Brown, 2002). Furthermore, the degree of benefit may be non – existent or minimal in patients with mild to moderate symptoms (Fournier et al., 2010). This suggests that antidepressants may only be effective in treating severe depression. Some evidence suggests that although antidepressants may be effective in the short term management of depressive episodes, these agents may be associated with poor long term outcomes including failure to prevent relapse once treatment is discontinued (Fava, 2003).

Some results from various meta- analyses and reviews have questioned the effectiveness of antidepressants altogether. Turner, Matthews, Linardatos, Tell and Rosenthal (2008) reviewed 74 trials of 12 antidepressants and their results showed studies reporting favourable outcomes were 16 times more likely to be published than those with non – favourable outcomes, representing a substantial publication bias. Furthermore, 11 studies did not report their negative results from pre – specified primary outcome measures but instead reported positive results from a different, secondary measure. These findings have been replicated across other meta - analyses which also highlight the biases in

reporting that inflate the apparent efficacy of anti – depressants (Pigott, Leventhal, Alter & Boren, 2010; Kirsch et al., 2008).

Anxiolytic agents. Benzodiazepines (BDZ) are a category of anxiolytic agents which produce their therapeutic effects by augmenting the activity of the gamma – aminobutyric acid_A receptor (GABA_A receptor; Kandel, Schwartz & Jessell, 2000). BDZ possess sedative, anxiolytic, anticonvulsant and muscle relaxant properties making them effective in the treatment of anxiety disorders (Tallman, Paul, Skolnick & Gallager, 1980). GABA is the main inhibitory neurotransmitter in the brain and therefore, the relaxing effects of BDZ are due to the enhancement of GABAs' inhibitory effects (Kandel et al., 2000). BDZ are generally fast acting and tolerated, however continued use produces significant adverse effects such as dependence, memory impairments and discontinuation – syndrome (Chouinard, 2004). BDZ are no longer recommended as a first line treatment of anxiety. NICE (2011a) clinical guidance states that BDZs should not be offered for treatment in primary or secondary care, except as a short – term measure during a crisis.

MAOs, TCAs and more recently SSRIs and SNRIs have demonstrated anxiolytic properties and been utilised for the treatment of anxiety disorders. Various SSRIs and SNRIs, remain recommended drug treatments for GAD, OCD and PTSD by NICE (2005a, 2005b, 2011b). Pregabalin is an anticonvulsant medication which has also been approved for the treatment of GAD where SSRIs or SNRIs are intolerable to the patient (NICE, 2011b). Pregabalin has demonstrated comparable effects to SSRIs and SNRIs in patients with moderate to severe GAD, however for Pregabalin, anxiolytic effects were apparent within one week of beginning treatment (Owen, 2007).

Effectiveness of anxiolytic agents. The effectiveness of benzodiazepines for the treatment of anxiety disorders in the short term has been established, however long term

efficacy remains controversial (Lader, 1999). Furthermore there are recognised risks associated with benzodiazepine use including sedation, psychomotor impairment, addiction and dependence (Lader 1999). SSRIs and SNRIs have become clinically popular in the treatment of anxiety disorders due to their equal or superior effectiveness to tricyclic antidepressants and benzodiazepine agents (Boyer, 1995; Rocca, Fonzo, Scotta, Zanalda, & Ravizza, 1997). Furthermore these agents have more favourable side effect profiles, safety and tolerability compared to older classes of anxiolytic medications like benzodiazepines (Kent, Coplan & Gorman, 1998). These agents are still far from optimal however as they suffer various inadequacies including discontinuation syndromes, delayed onset of clinical effect, sexual dysfunction and a substantial number of patients who are ‘non – responders’ to pharmacological treatment (Nemeroff, 2003). Under current NICE guidelines, pharmacological treatments should be offered alongside high intensity psychological interventions to patients experiencing marked functional impairment and have not responded adequately to low intensity interventions (Step 3; NICE, 2011b; 2005a, 2005b).

Psychological treatments for common mental health disorders

The National Institute of Health and Clinical Excellence (NICE) provides national, evidence based clinical guidelines on the management of individual health conditions in NHS services. In the most recent clinical guidance for CMHDs, NICE have identified four main psychotherapies which should be available to patients depending on an assessment of the patients’ needs and preferences (NICE, 2011a).

Short term psychodynamic psychotherapy (STPP). Short term psychodynamic therapy has roots in the psychoanalytic tradition and has been developed by a number of contributors, most notably, Malan, Davanloo and Sifneos (Davanloo, 1980). STTP is considered a structured form of psychodynamic therapy which lasts around 20 sessions.

The aim of STPP is to reveal, re – experience and work through repressed emotional conflict by means of analysis, resistance and transference (Bauer & Kobos, 1984). The therapist is required to take an active role in engaging the patient in the therapeutic process and building an effective therapeutic alliance. This is required in order for the patient to trust the therapist enough in order to explore past and present events that may be interfering with adequate functioning (Bauer & Kobos, 1984). The effectiveness of STPP has been demonstrated in various meta-analysis (Driessen et al., 2010; Leichsenring, 2001; Leichsenring, Rabung & Leibing, 2004). Still, controversy remains regarding the effectiveness of psychodynamic based psychotherapies (Auchincloss, 2002; Wallerstein, 2002) and as such practitioners are advised to consider STPP as a treatment option for moderate to severe symptoms of CMHDs but discuss the uncertainty of its effectiveness with the patient (NICE, 2011a).

Interpersonal Therapy (IPT). Interpersonal therapy was developed in the 1970's by Gerald Klerman and colleagues (Klerman, Weissman, Rounsaville & Cheveron, 1984) as a time limited, structured psychotherapy for depression. A core feature of IPT is its emphasis on current difficulties in close relationships while also acknowledging the role of genetic, biochemical developmental and personality factors in the causation and vulnerability to depression (Klerman et al., 1984). IPT typically consists of three phases: phase one constitutes a diagnostic assessment and a review of the patient's current close relationships and social functioning. Phase two includes the development of specific strategies targeting exact interpersonal problems. Phase three involves the recognition and consolidation of therapeutic gains (de Mello, de Jesus Mari, Bacaltchuk, Verdeli & Neugebauer, 2005). The effectiveness of IPT in treating depression has been demonstrated in various reviews and meta-analysis (Cuijpers et al., 2006; de Mello et al., 2005, van Hees,

Rotter, Ellermann & Evers, 2013). As such, IPT is a NICE recommended treatment option for those experiencing moderate to severe symptoms of CMHDs (NICE, 2011a).

Cognitive Behavioural Therapy (CBT). Cognitive behavioural therapy is an active, time – limited, structured therapy used to treat a range of psychological disorders (Beck, Rush, Shaw, Emery, 1979). CBT as known today is an amalgamation of two therapies: behaviour therapy developed by Wolpe in the 1950's (Wolpe, 1958) and cognitive therapy proposed by Beck and colleagues in the 1970's (Beck et al., 1979). A variety of cognitive and behavioural techniques and principles are employed in CBT. A core principle of CBT is that people's emotions and behaviours are largely influenced by the way we think about the world – our cognitions, which are themselves based on cognitive schemas (Beck et al., 1979). Cognitive techniques are therefore used to identify and 'reality – test' the patients' maladaptive assumptions. Beck et al. (1979) outline the core aims of CBT: (1) to teach the patient techniques to monitor negative automatic thoughts, (2) to identify the links between cognition, affect and behaviour, (3) to observe the evidence for and against these automatic thoughts and to replace them for more reality-oriented interpretations, (4) to identify and change the dysfunctional core beliefs.

CBT also highlights the importance of our behaviours in influencing our thoughts and emotions. The behavioural component of CBT therefore includes behavioural techniques, such as activity scheduling, the aim of which is to alter the negative attitudes that hinder the patient's level of activity (Beck et al., 1979). CBT focuses on the present, rather than events that happened in the past and has an emphasis on empirically validating its principles through scientific investigation rather than relying solely on clinical anecdotes (Westbrook, Kennerley & Kirk, 2011). CBT is one of the most comprehensively researched psychotherapies (Butler, Chapman, Forman & Beck, 2006) and is the dominant

psychotherapy model in the UK (Westbrook et al., 2011). CBT remains a recommended treatment option for CMHDs, as well as schizophrenia and eating disorders (NICE, 2004; NICE, 2011a, NICE, 2014).

Behavioural activation (BA). Behavioural activation as a treatment for depression is a form of activity scheduling which encourages patients to learn how to monitor their mood and daily activities (Cuijpers, van Straten & Warmerdam, 2007). BA is a brief, structured psychosocial approach to treating depression which focuses on behavioural change (Dimidjian, Martell, Addis & Herman – Dunn, 2008). The principles of behavioural activation derive from Ferster's model of depression, which was based on learning theory (Ferster, 1973). This model of depression states that when people are depressed, the majority of their activities serve to avoid or escape aversive thoughts and feelings. Depression develops when a person has established a narrow repertoire of passive, avoidant behaviour. Lewinsohn, Biglan and Zeiss (1976) developed the first behavioural activation treatment for depression in which patients learnt to monitor their mood, their daily actions and how to increase the number of pleasant activities they engaged in. Through the process of behavioural activation therapy, patients learn how to create a plan to achieve these aims, with particular attention being paid to social skills and interpersonal interactions (Cuijpers et al., 2007). In one seminal study, Dimidjian et al. (2006) report a randomised controlled trial (RCT) in which behavioural activation was compared with antidepressant medication (the SSRI paroxetine), cognitive therapy and a placebo in 214 outpatients diagnosed with depression. Results showed that for patients with more severe depression, BA was as effective as paroxetine and more effective than cognitive therapy. Compared with paroxetine, BA also had a significantly higher rate of treatment compliance and was associated with significantly higher rates of remission. The effectiveness of behavioural

activation has also been reviewed in meta-analysis and systematic reviews (Cuijpers et al., 2007; Ekers, Richards & Gilbody, 2007; Mazzucchelli, Kane & Rees, 2009; Sturmey, 2009). These analyses demonstrate behavioural activation is an effective psychological treatment for depression, however on the whole, effect sizes do not appear to be significantly different from cognitive therapy or CBT. Behavioural activation may be particularly useful however, in people for whom CBT has not been effective and for those who have severe depression (Sturmey, 2009). As such, behavioural activation is a recommended treatment option for people with moderate – severe symptoms of depression being treated within the NHS (NICE, 2011a).

1.3. The unmet need for help

Despite the existence of a range of biological and psychological treatments for CMHDs, there is a substantial under – treatment of these disorders in the population (Andrews, Cuijpers, Craske, McEvoy & Titov, 2010).

The treatment – provision gap. On the whole, global health systems have not acted sufficiently to address the burden of mental health disorders and subsequently, the gap between treatment need and its provision is large worldwide (WHO, 2013). For example, a multi – country review on treatment gaps found 56% of people with depression had not received treatment in the last 12 months (WHO, 2008). Approximately a third of countries do not have a specific mental health budget and of the countries that do, a disproportionately small amount (typically less than 1% of a countries total health budget) is allocated to mental health (WHO, 2008). Given the personal and economic costs of CMHDs already described, such facts are of considerable concern.

In the UK, it has been estimated that just a third of people with depression and less than a quarter of individuals with anxiety disorders are receiving some form of treatment (Department of Health [DOH], 2008). NICE guidelines state that individuals experiencing CMHDs should be offered evidence – based treatments such as CBT (NICE, 2011a) as an alternative to psychotropic medications such as SSRIs. NICE have recognised that evidence – based, psychotherapy interventions like CBT are preferred by most patients (NICE, 2011a). Despite this, psychotropic medications remain the most common treatment for CMHDs in primary care due to the scarce availability of (or significant wait for) psychological interventions (NICE, 2011a). Furthermore, because many patients are unwilling to take psychotropic medication, there is a substantial under treatment of CMHDs in the population (DOH, 2008).

In the early 2000's, it was evident that demand for CBT far outstripped supply. It was accepted that there simply were not enough trained CBT therapists to meet demand and the problem was further exacerbated by the inequitable distribution of therapists throughout the country (Lovell & Richards, 2000; Shapiro, Cavanagh & Lomas, 2003). A review of the availability of CBT therapists in England and Wales in 2003 showed a 20 fold discrepancy between the best and worst served areas, highlighting the 'postcode lottery' of finding a CBT therapist (Shapiro et al., 2003). In 2008 the government launched the Improving Access to Psychological Therapies (IAPT) program³, a large scale initiative aimed at significantly increasing the availability of NICE recommended, evidence based psychotherapies in NHS commissioned services (DOH, 2012). In a post – IAPT landscape, and a decade on from the original inquiry, it has been evidenced that there has been a significant increase in the number of accredited CBT therapists in England and Wales, and

³ Further specifics of the IAPT program will be discussed.

there is now more equitable distribution of therapists throughout the population (Cavanagh, 2013). Unfortunately there continues to be some geographic inequity of CBT therapists and waiting lists for face to face CBT therapy remain long, meaning that access to CBT is still limited and variable (Cavanagh, 2013; Cavanagh & Millings, 2013a). In their three year report, the DOH concede that despite the successes of the IAPT program, provision of services throughout the country are still insufficient (DOH, 2012).

Avoidance of seeking professional treatment. It is not only the treatment – demand gap contributing to the under treatment of CMHDs in the population. For various reasons, many people do not seek professional help and so CMHDs often go undiagnosed (NICE, 2011a). Of all depressive disorders presenting in the community at one time, it is probable that only 30% are recognised and treated (NICE, 2011a). Reasons for not seeking professional help for CMHDs include practical issues, like the cost of treatment, costs of transportation or the inconvenience of having to travel and fit around other commitments (Gulliver, Griffiths & Christensen, 2010; Mojtabai, 2001). Other barriers include having negative attitudes towards help seeking in general, preferring to resolve the issue on their own, and belief the treatment they receive will not be helpful (Mojtabai, 2001).

The worry about potential stigma and embarrassment is also a barrier to seeking help. Many people report worrying about confidentiality and of other people finding out they have sought treatment (Gulliver et al., 2010). Stigma associated with mental illness is in fact one of the most commonly reported reasons for not seeking professional help (Corrigan, 2004). The nature of the disorders themselves, often mean people do not seek treatment. For example, in PTSD, there is an avoidance of reminders of the traumatic event, therefore many people with PTSD avoid talking about their issue, making assessment of PTSD difficult (NICE, 2005b). Similarly, people with OCD are often ashamed or

embarrassed about their condition and subsequently find it very difficult to talk about their symptoms with professionals, friends or relatives (NICE, 2005a). What is evident is that a number of systemic and personal variables contribute to whether or not an individual will seek out psychological therapies for CMHDs.

1.4. Self – help and low intensity interventions.

It is evident then that highly trained mental health professionals are a finite, scarce resource and extending traditional, one to one psychotherapy to the entire population in need of treatment is not a feasible possibility (Bennett – Levy, Richards & Farrand, 2010). Increasing access to evidence – based psychological therapies in the form of clinically effective self – help and low intensity interventions can offer a potential solution to this problem. One mental health framework in which low intensity and self – help interventions are offered is the Improving Access to Psychological Therapies Initiative.

Improving access to psychological therapies. Originally launched in 2008, the Improving Access to Psychological Therapies (IAPT) programme is a large scale initiative with the objective of significantly increasing the availability of NICE recommended psychological treatments for depression and anxiety disorders in NHS commissioned services in England (DOH, 2012). Aspects of achieving this aim included organising the provision of services using the ‘stepped model of care’ and training a new workforce of practitioners to deliver ‘low intensity interventions’. The stepped care model is a framework of health care delivery in which a patient receives clinical assessment and then is recommended the least intensive, but clinically effective treatment in relation to the severity of their condition. For mild to moderate severity or persistent sub threshold disorders, a patient may enter at Step 2 and receive a brief, psychological treatment, termed

a low intensity intervention (DOH, 2008). Low intensity interventions may include guided self – help, self – help groups and computerised cognitive behavioural therapy. High intensity treatments delivered in Step 3 are then reserved for patients with more severe symptoms or for those who have not responded to first line, low intensity treatment (DOH, 2008). These high intensity treatments typically include face to face CBT, interpersonal therapy or counselling (NICE, 2011a). Figure 1.1 illustrates the stepped model of care for CMHDs.

The stepped care model has two fundamental aspects: using the least intensive intervention (in terms of specialist therapist time) while maximising clinical benefit and allowing patients to ‘step up’ to higher intensity treatments if needed (Bower & Gilbody, 2005). By 2012 and three years into the initiative, the IAPT programme was partway through roll out and had treated more than one million patients (DOH, 2012). The stepped model of care, and in particular the formalisation and use of low intensity interventions, represents a significant shift in how mental health services are being delivered. It has been described as the birth of a new era in the delivery of mental health services (Bennett – Levy, Richards & Farrand, 2010).

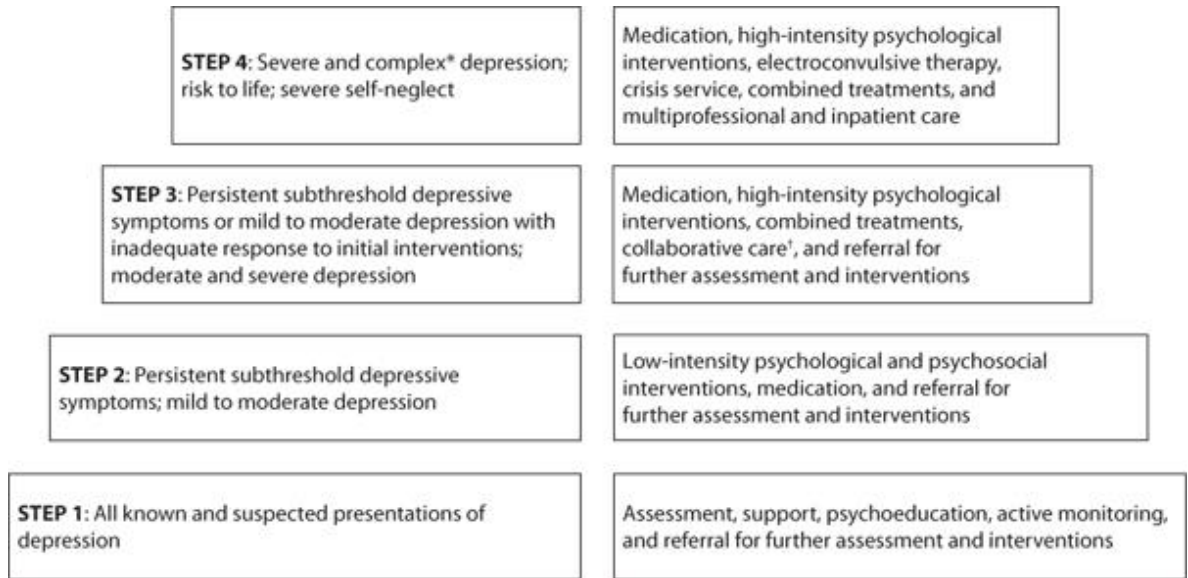


Figure 1.1. The IAPT stepped model of care for common mental health disorders, reproduced from NICE, 2011a.

What are self – help and low intensity interventions?

In the U.K. the term ‘low intensity’ came into usage in the early 2000’s to refer to interventions which reduced the amount of therapist time required and/or usage of therapist time in a cost – effective way (Bower & Gilbody, 2005, Lovell & Richards, 2000). The aim of low intensity interventions is to increase access to evidence – based psychotherapies in order to improve mental health on a community – wide basis, whilst using the minimum level of intervention required to create the maximum clinical benefit (Bennett – Levy et al., 2010). As such, low intensity interventions are intended primarily for people with mild to moderate psychological disorders, allowing higher intensity interventions to be set aside for those with more severe symptoms (Bennett – Levy et al., 2010). High intensity interventions is a term which encapsulates traditional one to one psychotherapies such as individual CBT, short term psychodynamic psychotherapy and counselling. In the stepped

model of care, low intensity interventions for depression include guided self – help (in the form of bibliotherapy and workbooks), computerised CBT, structured physical activity, group – based self – help programs and self – help groups (NICE, 2011a). Low intensity interventions for GAD include guided and non – guided self – help, psychoeducational groups and self – help groups (NICE, 2011a).

Self – help books and bibliotherapy

The concept of using written materials for self – improvement, guidance and for therapeutic benefit has a long history. The genesis of self – help materials in western culture may be traced to the publication of the first self – development book, *Self – Help* written by Samuel Smiles in 1859. Bibliotherapy (a term coined by Samuel Crothers in 1916) as a formal treatment modality dates back to the early 20th century at a time when librarians and hospital staff looked to books in order to treat veterans of World War 1 and institutionalised psychiatric patients who were in recovery for long periods of time (Dysart – Gale, 2007; Panella, 1996). The first documented experimental program of clinical bibliotherapy began in the 1930’s when William Menninger introduced “mental hygiene literature” for patients at his Menninger Clinic, a psychiatric institution in the United States. Under this program, books (such as *The Human Mind* by Karl Menninger) were prescribed to patients as a means of psychoeducation and encouragement (Dysart – Gale, 2007).

Skipping forward to the 21st century and now many of the most effective interventions for CMHDs have been translated into self – help books and are used for bibliotherapeutic purposes. In this context, self – help books should include a collection of specific psychological treatment materials delivered alone or with minimal support and do

more than merely give information and advice⁴ (Lewis et al., 2003; Richardson & Richards, 2005). Popular titles include those in the ‘Overcoming’ series, such as *Overcoming Depression* (by Paul Gilbert) and *Overcoming Anxiety* (by Helen Kennerley). In the early 2000’s bibliotherapy and ‘books on prescription’ schemes were gaining popularity in primary care in the UK (Richardson & Richards, 2010). Now, bibliotherapy (as a guided self – help intervention) is a recommended treatment option for mild to moderate symptoms for CMHDs in the IAPT stepped model of care (NICE, 2011a).

There is some evidence for the value of self – help books. Meta-analysis and systematic reviews have evidenced that bibliotherapy is more effective than no treatment at all (Gould & Clum, 1993; Marrs, 1995; Scogin, Bynum, Stephens & Calhoon, 1990) and can be as effective as traditional psychotherapy treatments (Cuijpers, 1997; Lidren et al., 1994; Scogin et al., 1990). In a more contemporary meta-analysis, Farrand and Woodford (2013) demonstrated written CBT self – help was more effective than control conditions (Hedges' $g = -0.49$, 95% CI $[-0.60, -0.37]$). Evidence also suggests effect sizes do not tend to differ by the level of support offered to self – help readers (Farrand & Woodford, 2013; Gould & Clum, 1993) and positive effects are maintained at follow – up (Lidren et al., 1994).

1.5. Computerised cognitive behavioural therapy (CCBT)

Developments in technology over the past 20 years have permitted an innovative, second wave of self – help manualisation in the form of computerisation. The advent of cheap home computing and the growth of the internet has invariably led to the translation of effective psychological interventions into computerised formats.

⁴ This definition excludes the types of self – help books based on ‘popular psychology’ which address a broad spectrum of emotional and relational problems and offer guidance on general wellbeing (Pantolon, 1998).

Background

Computerised cognitive behavioural therapy (CCBT) is an umbrella term describing the deliverance of CBT via an interactive computer interface (NICE, 2006). Crucially, this definition includes the caveat that the CBT program uses patient input to make at least some therapy decisions⁵ (Marks & Cavanagh, 2009). Where early stand alone, computerised treatment programs were primarily CD – ROM or computer software based (e.g. ‘Overcoming Depression’ and early versions of Beating the Blues), newer programs are typically delivered over the internet (e.g. MoodGYM and Living Life to the Full). These internet programs have the same content as their older counterparts, simply translated into a more accessible, online format. The evolution from static PC packages and CD – ROMs to internet delivery has resulted in a number of other terms being invented to describe these activities. These terms include; web – based therapy, eHealth, e – interventions, internet – delivered therapy, to name a few (Barak, Klein & Proudfoot, 2009). For the purposes of this thesis, CCBT refers to any computerised or internet based intervention based on the principles of CBT, in which routine aspects of therapy are delegated to the computer and which uses patient input to make therapy decisions⁶.

Computerised CBT packages are typically split into several modules and are designed to be completed over a number of weeks, much like traditional face to face CBT⁷. The CCBT package may include broad therapy strategies such as assessment, psycho – education, identification of problems and setting intervention goals (Marks & Cavanagh, 2009). CBT is a highly structured therapy, with clearly delineated procedures and

⁵ This definition therefore excludes any use of information technology (such as video conferencing, email, chat rooms and web cams) to facilitate communication between a patient and a therapist without the delegation of any routine aspects of therapy to the computer (Marks et al., 2007).

⁶ Differentiation between different ‘subtypes’ of CCBT will be made explicit where necessary.

⁷ The term ‘traditional CBT’ will be used to refer to face to face CBT.

techniques which make it particularly suited to self – guided, computerised delivery (Richardson & Richards, 2006; Proudfoot, 2004). These CBT specific techniques are presented in a computerised, multimedia format. Such techniques may (broadly) include recognising the associations between cognition, emotion, behaviour and physiology (see Figure 1.2 for example); identifying, reality testing and correcting distorted automatic thoughts; substituting these biased cognitions for reality – oriented interpretations (Beck et al., 1979). CBT homework is expected to be completed in between sessions and can include activities like doing a pleasurable activity, completing a mood diary or thought record or challenging unhelpful thoughts. Feedback on homework tasks is provided by the program to reinforce learning (Proudfoot, 2004). The programs themselves are interactive, typically incorporating video clips, audio voice – overs, animations and static images. The program may include a narrator (e.g. a “therapist”) who will guide the patient through each session using voiceover or video (Marks & Cavanagh, 2009). User input may include clicking responses to multiple choice questions (see Figure 1.3) and free text responses using keyboard input. Some programs, (e.g. Beating the Blues) contain a range of algorithms which may be activated depending on user input. This allows some level of personal tailoring of responses from the program. These components of CCBT are discussed below.



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Figure 1.2. Example of how a CCBT program provides psycho – education, such as highlighting the links between our cognitions, emotions, physiology and behaviour. The example given is from FearFighter™, a CCBT program for panic and phobia.

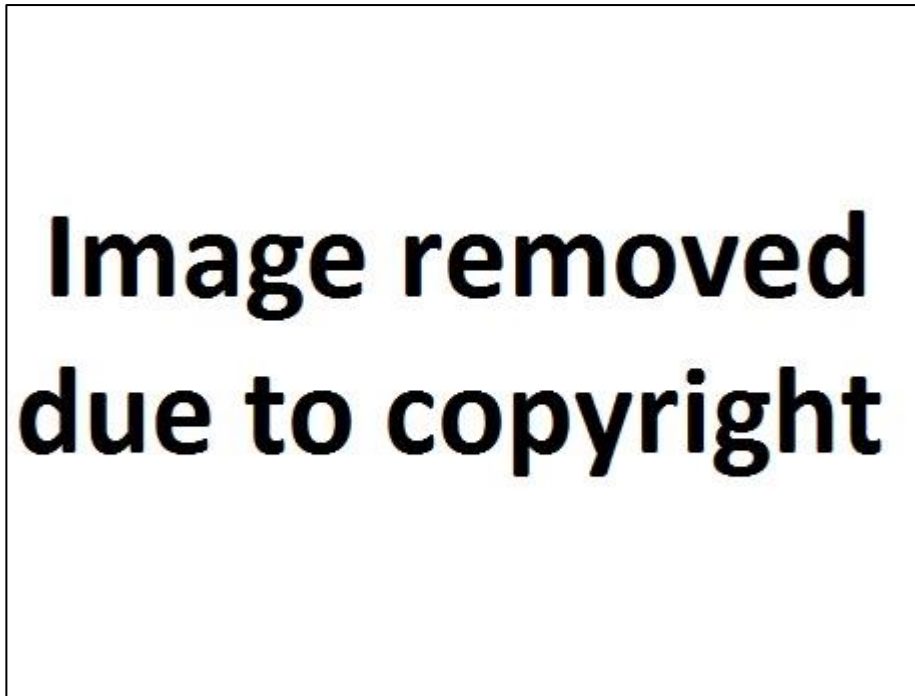


Figure 1.3. Example of a CCBT interface in which the patient is able to choose responses on a predetermined scale. This is taken from Beating the Blues ®, a CCBT program for depression and anxiety.

Although the field has enjoyed considerable expansion, a lack of clarity has resulted in a general inconsistency in the terminologies used to describe CCBT interventions (Barak et al., 2009). Furthermore, programs vary widely in the amount of interactivity they offer, the quality of the user interface and the degree to which they embody ‘common factors’⁸, which may promote therapeutic engagement (Barazzzone, Cavanagh & Richards, 2012). Programs also differ in the way they are accessed (e.g. within primary care, or outside of healthcare settings) and the level of human therapeutic support offered to program users. Each difference in program interactivity, embodiment of common factors, mode of access

⁸ Common factors are the aspects of therapy which operate across all types of psychotherapy, regardless of specific treatment approaches. Common factors can include such things as the therapeutic alliance, empathy and acceptance (Knowles et al., 2014).

and level of support all have implications for CCBT engagement and clinical effectiveness. For example, it is assumed that increased interactivity and variety of multimedia promotes program engagement (Abbott, Klein & Ciechomski, 2008). Programs vary considerably in their ability to embody ‘common factors’ crucial to developing a therapeutic relationship (Barazzzone et al., 2012) and it has been proposed that high attrition from some programs may be a consequence of failures to incorporate these common factors (Christensen, Griffiths & Farrer, 2009). Programs accessed in health care settings may elicit a different set of expectations from the program user than those accessed freely on the internet. There has also been various discussions around the level of human therapeutic support required for therapeutic efficacy (Newman, Szkodny, Llera & Przeworski, 2011). Each of these issues will be discussed in turn, however, it is important to define and categorise differing CCBT programs in order to make reliable and valid comparisons between them and to explore what the “active” mechanisms of these programs are (Barak et al., 2009).

Definition

A categorisation system for internet interventions provided by Barak et al. (2009) offers a framework for differentiating between the CCBT programs presented in this thesis. However, as Barak et al. specifically looked at internet supported interventions, the wording requires adaptation to include all computerised modes of delivery such as DVD – ROM, CD – ROM, computer packages and internet – based delivery. Furthermore, their definition does not entirely capture the full range of archetypal CCBT components, such as specific and common factors. As such, by adapting and amalgamating definitions of CCBT from various sources (e.g. Barak et al., 2009; NICE, 2006; Marks & Cavanagh, 2009, Marks, Cavanagh & Gega, 2007), the following definition of CCBT is offered:

Computerised cognitive behavioural therapy refers to the deliverance of CBT via an interactive computer interface. They are primarily self – directed intervention programs that are implemented by means of a prescriptive computerised program, operated through a computerised medium, and used by people seeking mental health related assistance. The program utilises user input to make at least some therapeutic decisions. The intervention program itself endeavours to generate therapeutic change. This is achieved through the provision of empirically – supported CBT techniques, common factors and the use of interactive, multi – media components.

Sub – categories and components

Barak et al. (2009) also propose three critical components of such interventions. These include; (1) program content (2) multimedia use/choices and (3) provision of guidance and supportive feedback. Program content refers to the information disseminated within the program and is considered to be the ‘back – bone’ of CCBT interventions. Multimedia use refers to the utilisation of multimedia and interactive components to disseminate the program content, e.g. text, audio or video. Provision of guidance and supportive feedback refers to the way in which users can attain information about themselves and their progress. Such feedback and support can be provided by either automated programming based on computerised algorithms, or by a human being. The degree of support provided also varies considerably between programs. On this note, Barak et al., (2009) also propose *self – guided* (fully automated programs offering no human support) and *human – supported* interventions as two main subtypes of computerised interventions. This dichotomous separation of CCBT programs can be further sub – compartmentalised according to the length of therapeutic support offered. Newman et al.,

(2011) offers a framework that distinguishes between interventions, purely based on the amount of human – therapeutic support offered to the program user. These sub – categories include:

- (1) *Self – administered therapy (SA)* in which therapist contact is for assessment at most, or fully automated programs in which there is no therapist contact at all.
- (2) *Predominantly self – help (PSH)* in which therapist contact (post assessment) is used for check – ins and brief assistance in how to use the program. PSH does not use more than 1.5 hours of a therapist’s time (in total).
- (3) *Minimal – contact therapy (MCT)* consists of more active involvement of a therapist, albeit less than traditional therapy. The therapist supports the program user in applying CBT techniques and uses more than 1.5 hours of the therapist’s time.

This typology also includes “Predominantly therapist administered treatments” in which the client has regular contact with a therapist for a given number of sessions and the use of CCBT is primarily to augment this. As these treatments do not significantly reduce the amount of therapist time and augment the regular therapeutic process, these interventions are not considered under the CCBT umbrella term. In their efforts to capture the range of internet – supported therapeutic interventions, Barak et al., (2009) also propose the categories of “*Online Counselling and Therapy*⁹” and “*Internet – Operated Therapeutic Software*¹⁰”. Neither of these types of interventions fall under the umbrella term of CCBT outlined above, and so are not considered in this thesis.

⁹ Refers to the use of technology for delivering therapy and counselling through interpersonal communications like email or webcam. This does not save a significant amount of time for the therapist and does not delegate treatment decisions to a computer.

¹⁰ Refers to therapeutic software which uses advanced computing capabilities such as artificial intelligence in robotics and 3D environments.

Effectiveness of CCBT

The effectiveness of CCBT has been demonstrated in various randomised trials and meta – analysis. In particular, seminal studies conducted in the early to mid – 2000’s aimed to determine whether CCBT was clinically effective. Kenwright, Lines and Marks (2001) report a feasibility study in which guided CCBT was delivered in a primary care centre (the ‘Self – Care Centre’) which accepted self – referrals. After screening for suitability, patients began six sessions of FearFighter, a CCBT program for panic/phobia. Two clinical nurses provided guidance on how to use the program and reviewed patient progress, however the program was primarily self – managed. Pre and post treatment scores of 54 FearFighter patients were compared with that of 31 outpatients with panic/phobia treated by nurse therapists. Results indicated that both groups significantly improved from pre to post treatment and the two groups were comparatively the same on symptom severity at post treatment. This was achieved even though CCBT patients spent 83% less time with a clinician compared to the outpatient sample. These findings were replicated in an open trial of FearFighter delivered over the internet with brief therapist support via telephone (Kenwright, Marks, Gega & Mataix – Cols, 2004). After successful open trials, a RCT was conducted which compared FearFighter to face to face, clinician guided therapy and a placebo group which received a course of computer/audio delivered relaxation (Marks, Kenwright, McDonough, Whittaker & Mataix – Cols, 2004). On all post intervention measures, the FearFighter and clinician guided therapy groups each improved significantly compared to baseline and improved significantly more than the relaxation group. Post intervention scores on all measures did not significantly differ between the FearFighter and clinician delivered therapy groups, even though the clinician group had 3.7 times more clinician contact than the FearFighter group. This RCT demonstrated that guided CCBT for

panic/phobia was able to be clinically effective whilst reducing the need for specialist clinician time.

In the same year, Proudfoot et al. (2004) published a RCT for the clinical efficacy of Beating the Blues, a CCBT program for depression and anxiety. 274 patients were recruited from primary care surgeries and randomly allocated to receive either Beating the Blues ($N = 146$) or treatment as usual (TAU: $N = 128$), being whatever treatment the practitioner prescribed. Practice nurses guided patients in logging onto the program and were available for technical assistance but spent no longer than 10 minutes per session supporting patients. At post intervention, patients in the CCBT group scored significantly lower (by around 2 – 7 points) on the Beck Depression Inventory (BDI) than the TAU group. Proudfoot et al. (2004) therefore highlighted guided CCBT for depression and anxiety was clinically effective in primary care.

Christensen, Griffiths and Jorm (2004) present a RCT of an internet based CCBT program for depression called MoodGYM. Participants were an Australian based, community sample of 525 individuals with elevated symptoms of depression and who were not receiving clinical care for their symptoms. Participants were randomly allocated to receive either the MoodGYM program ($N = 182$), a psychoeducation website ($N = 166$) or a control condition ($N = 178$). Intention to treat analysis indicated both MoodGYM and the psychoeducation website were significantly more effective in reducing symptoms of depression than the control condition. MoodGYM also significantly reduced dysfunctional thinking. This study therefore highlights the value of internet based CBT delivered outside of health care systems.

Over the past decade, efforts have continued to illustrate the effectiveness of CCBT for a range of CMHDs. In randomised controlled and open trials, CCBT has consistently

demonstrated clinical effectiveness and efficacy in tackling symptoms of depression (Andersson et al., 2005), GAD (Paxling et al., 2011), OCD (Andersson et al., 2012), panic disorder (Carlbring et al., 2006), PTSD (Klein et al., 2010) and social phobia (Berger et al., 2011). Meta - analyses also tend to demonstrate clinical effectiveness of CCBT when compared to placebo control groups, treatment as usual or face to face psychotherapies (Andersson & Cuijpers, 2009; Andrews et al., 2010; Cuijpers et al., 2009; Foroushani, Schneider & Assareh, 2011; Spek et al., 2007). While these meta - analyses have provided evidence for the clinical benefits of CCBT, few have investigated the moderators of these effects. The moderators of the effectiveness of CCBT will be explored in a meta-analysis presented in Chapter 2.

CCBT in the IAPT stepped model of care

CCBT is included as a treatment option in the NHS stepped model of care. NICE clinical guidance states CCBT should be offered as a treatment choice for the management of depression in primary and secondary care (NICE, 2009a) and for the management of anxiety disorders in primary, secondary and community care (NICE, 2006; 2011b). Within Step 2, CCBT is offered as a more structured treatment alternative to initial interventions like exercise or work book based guided self – help. CCBT is positioned as a low intensity intervention for people with mild to moderately severe symptoms and program use is supported by health – professionals. Patients may be ‘prescribed’ CCBT by their GP, in which case the program is either completed in routine care settings, such as the GP surgery or at home. Alternatively, GPs may refer patients to an Improving Access to Psychological Therapies service which will subsequently provide the necessary support network for completing a course of CCBT. Patients can also self – refer into IAPT services if they do not wish to speak to their GP about their CMHD. Either way, appropriate assessment is

conducted prior to commencing the program to ensure they are suitable for therapy. Health professionals monitor progress and screen weekly progress reports for any deterioration in symptoms. When accessed in an IAPT service, low intensity practitioners will make scheduled contact with the user, either by phone, email or face to face, to offer therapeutic support and discuss any issues with implementing the program. The length of contact varies, but should range between 5 – 10 minutes per contact and no more than 1 hour over three months (DOH, 2007). The programs used in these contexts are therefore guided interventions, predominantly self – help interventions specifically (Newman et al., 2011). However, although support is provided, the emphasis with CCBT (and all low intensity interventions) is on greater patient self – management (DOH, 2008).

It is important to clarify that the programs employed in the stepped care model have been subject to technology appraisals (Kaltenthaler et al., 2006) and are considered clinically effective interventions based on effectiveness studies (like randomised controlled trials).

CCBT in non – health care contexts

In addition to provision in health care contexts many CCBT programs are also available for individuals to access free of charge or at a cost. These programs are likely to be self – guided interventions, but some do provide facilities for obtaining human support. A simple internet search for CCBT will offer users information on multiple online CCBT interventions currently available. The most widely used, self – guided CCBT programs online include MoodGYM (available at <https://moodgym.anu.edu.au>) and Living Life to The Full (available at <http://www.lltf.com>). MoodGYM was developed by a team headed by Professor Helen Christensen at the Centre for Mental Health Research at the Australian National University (Christensen, Griffiths & Korten, 2002) and is a free to access, self –

guided internet CBT intervention. Living Life to The Full was developed by Professor Chris Williams, at the University of Glasgow and is also free to access online. MoodGYM in particular has an extensive scientific evidence base (Christensen et al., 2002; Christensen et al., 2004; Christensen, Griffiths, Mackinnon & Brittliffe, 2006). These programs are currently endorsed by the British Association for Behavioural and Cognitive Psychotherapies (BABCP) as free to access self – help CBT programs (Gourney, 2006). Online information provided by NHS Choices¹¹ (as well as some individual NHS trusts) also endorses these two interventions as appropriate forms of CBT self – help. An important caveat of these programs is they do not tend to actively promote themselves as replacements for seeking face to face help from a mental health professional, however, the extent to which program users actually do seek such traditional help after (or alongside) visiting CCBT sites is unknown.

Users of these types of CCBT interventions may be referred to as ‘spontaneous visitors’ or ‘public users’ (Christensen, Griffiths, Korten, Brittliffe & Groves, 2004). It is important to differentiate public users from CCBT trial participants and CCBT users in health care settings. Randomised controlled trials which evaluate the clinical effectiveness of CCBT programs can provide highly structured environments for participants, who are encouraged to complete the trial by research managers (Christensen et al., 2004). Similarly, CCBT users in care settings are usually offered structured therapeutic support. Completely automated, unguided programs, delivered outside of RCTs and mental – health services do not typically provide this supportive framework and so there are differences in levels of program engagement. For example, internet – based interventions which are open access

¹¹ NHS Choices is the U.K’s biggest health website, providing comprehensive physical and mental health information and descriptions of NHS England services.

and fully automated are associated with significantly higher levels of attrition than interventions offered in the context of controlled trials (Christensen et al., 2009). Such issues with program engagement will consequentially impact the clinical effectiveness of unguided interventions (Spek et al., 2007) and so limit the public health impact that they can make.

Advantages of CCBT

By reducing barriers to accessing treatment CCBT can offer a number of advantages over traditional therapies. CCBT provides immediate access to empirically supported CBT techniques, without the need to spend time on a waiting list for access to a CBT therapist. Program users can access the program in any number of locations with computing capabilities. CCBT therefore has the potential to reach individuals living in remote areas as it removes the need to travel. CCBT is convenient because it can be accessed whenever the user chooses to. Program sessions can be completed outside of normal working hours and can fit around family, social and occupational commitments. CCBT is flexible as modules can be repeated and users can work through the materials at their own pace. Being able to use the program at home allows a sense of privacy, confidentiality and a removal of the stigma associated with seeing a counsellor (Gega, Marks, & Mataix-Cols, 2004). Social discomfort involved in talking about sensitive topics is reduced because of the anonymity in CCBT and in turn this may increase self – disclosure (Joinson, 2001). Given the emphasis on self – management, these programs may also increase a sense of self – efficacy and achievement for the user (Cavanagh & Millings, 2013a).

CCBT significantly reduces time demands on therapists. Not only does this save on costs but it also frees up therapist time to meet the demand of more complex, higher intensity cases. Low cost (or no cost at the point of access) is also an advantage for the user.

CCBT programs also permit the dissemination of standardised, yet personalised treatments (Kaltenthaler et al., 2002). By using computerised algorithms, programs can be tailored to each user but still disseminate CBT specific techniques and treatment protocols in a standardised way. Computer programs do not suffer from memory problems and fatigue like some human therapists may do (Ghosh & Greist, 1988; Kaltenthaler et al., 2006), and they avoid a ‘therapist – drift’ away from the manualised treatment procedures (Waller, 2009).

1.6. Implementation issues

CCBT is a promising way to deliver standardised, evidence – based interventions. (Andersson, 2010). The effectiveness of CCBT has been well established (Andrews et al., 2010; Froushani et al., 2011). However the realities of CCBT implementation, in terms of dissemination, acceptability and use are less well known (Andersson, 2010). Given the potential public health impact of CCBT, barriers to widespread dissemination and using CCBT need to be adequately explored and ways to overcome these barriers addressed. Several (distinct but inter – related) aspects of CCBT use are currently of concern. These variables include;

1. *Acceptability of CCBT.* The acceptability of a treatment is a key component to consider when evaluating successful implementation (Kaltenthaler et al., 2008). How positive or resistant people are to the idea of using CCBT will have a substantial impact on whether people choose to begin using a program or not. This is important because CCBT programs will simply not achieve their potential health impact if they are not acceptable to people likely to benefit from using them. Despite the clear advantages of CCBT, the use of computers to deliver CBT self –

help has been met with criticisms and resistance by some therapists and researchers (Przeworski & Newman, 2006). Resistance by therapists in particular means that although CCBT is a treatment option in the stepped model of care, it does not mean patients who could benefit from using CCBT are being offered its use. Interestingly, patients tend to report more positive attitudes towards using CCBT than health practitioners (Cavanagh & Millings, 2013b; Stallard, Richardson & Velleman, 2010; Stallard, Velleman & Richardson, 2010). Consequently, if CCBT is not being offered in routine care, patients may look to internet – based, free to access CCBT programs instead. There is a distinct need to investigate people’s attitudes and acceptability towards CCBT (Kaltenthaler, Parry, Beverley & Ferriter, 2008; Kaltenthaler, Sutcliffe et al., 2008) because treatment acceptability is associated with treatment seeking, engagement and outcomes (Tarrier, Liversidge & Gregg, 2006). When considering the CCBT user journey (Cavanagh & Millings, 2013b), uptake of these programs will be highly associated with acceptability.

2. *Program engagement and attrition.* Eysenbach (2005) describes the phenomenon of participants stopping CCBT usage (“The Law of Attrition”) as one of the fundamental characteristics and challenges of eHealth applications. Attrition rates from CCBT research trials vary, with systematic reviews of CCBT research trials placing attrition rates between 31.75% (Kaltenthaler, Sutcliffe et al., 2008) and 44% (Waller & Gilbody, 2009). It is important to remember that attrition is not simply a problem confined to the field of CCBT interventions and that these figures do not differ dramatically from attrition rates seen in face to face therapies (5% - 38%; Watkins & Williams, 1998) or rates of premature medication discontinuation (27% - 30%, Barbui et al., 2004). However, due to the ease at which CCBT programs can

be dismissed, the problem of attrition is of critical concern for CCBT interventions deployed in the real world. Where the effectiveness of CCBT is now well established in controlled contexts, problems are commonly encountered when translating these results into practice (Doherty, Coyle & Sherry, 2012). High attrition, poor engagement and poor homework compliance are adherence problems that reduce the effectiveness of treatment (Addis & Jacobson, 2000). Research is therefore necessary to explore the barriers to and facilitators of engagement with CCBT in more naturalistic settings.

3. *The human factor in CCBT.* There has been scepticism surrounding CCBT due to the reduction of therapist support (Green & Iverson, 2009; Knowles et al., 2014). Where the well – defined treatment techniques of CBT can be successfully delivered via a computerised format, the idea that common factors such as the therapeutic alliance may also be activated by CCBT programs is more controversial (Peck, 2010). Much emphasis has traditionally been placed on the role of common factors in producing positive treatment outcomes (Lambert & Barley, 2002), and as the therapeutic process traditionally unfolds in a client – therapist dyad, common factors are conventionally seen as being embedded in this relationship. Therefore, the partial or complete removal of a human therapist has resulted in concerns that common factors, are missing in CCBT and that this will ultimately be a detriment to its effectiveness and patient safety (Whitfield & Williams, 2004). Concerns over the (assumed) lack of a therapeutic relationship is the most commonly cited worry surrounding the use of CCBT interventions (Helgadóttir et al., 2009; Macneil, Hasty, Evans, Redlich & Berk 2009; Stern, 1993, Wampold, 2001). Yet there is no published evidence that CCBT is harmful to clients or the therapeutic relationship

(Anderson, Jacobs & Rothbaum, 2004). As with written CBT self – help materials (Richardson, Richards & Barkham, 2006), preliminary research suggests some programs do incorporate key features of the therapeutic alliance, such as negotiation of goals, a collaborative framework and developing a secure base (Barazzzone et al., 2012). Few studies have explored the strength of the therapeutic alliance in CCBT. Studies that have tend to find that although aspects of the alliance such as agreement on therapeutic goals and the tasks required to achieve these goals may remain relative to therapist delivered CBT, the bond¹² aspect of the alliance is lower (Richards, Timulak & Hevey, 2013). In order to address the concerns surrounding the lack of human input and the therapeutic alliance in CCBT it is essential that this barrier to successful implementation be investigated further and the factors influencing this variable empirically examined.

Finding a solution

When considering strategies for reducing these barriers to implementation it is helpful to reflect on the key factors shown to influence engagement, alliance and successful outcomes in face to face therapy (Doherty et al., 2012). Research has demonstrated that above and beyond the contribution of specific and common factors, client factors are the leading single contributor to successful mental health outcomes (Assay & Lambert, 1999). Client factors are characteristics of the client and can include sociodemographic variables, personality, affective variables and expectations about treatment (Carter et al., 2011). However, no definitive set of predictors of response to psychotherapy has been identified (Carter et al., 2011; Sauer, Lopez & Gormley, 2003). The only client factor which has

¹² The bond aspect refers to the affective bond of liking, trusting and the attachment to the therapist (Bordin, 1979).

consistently been associated with outcomes, engagement and therapeutic alliance in traditional therapies is attachment styles (Dozier, 1990; Smith, Msetfi & Golding, 2010). In contrast, the role of adult attachment styles in CCBT is poorly understood. If adult attachment also influences the experience of CCBT as it does in traditional therapies, research can begin to explore program design and dissemination strategies to enhance uptake and engagement in real world deployments. Attachment styles and their influence in traditional therapy is explored in the next part of this chapter.

1.7. Attachment theory

Attachment theory in childhood: Bowlby's etiological theory of attachment

“Attachment” refers to the strong, affectionate tie we have with important people in our lives that leads us to feel pleasure when we interact with them and to be comforted by their nearness during times of stress (Berk, 2006). Bowlby's (1969, 1973, 1980) etiological theory of attachment explores the processes by which affectionate bonds are created between an infant and their primary care giver. It is proposed that the quality of infant attachment to their caregiver has profound consequences for the infant's feelings of security and ability to form trusting relationships throughout the life span (Berk, 2006). Bowlby maintained that the infant relationship with the parent begins as a set of innate signals that aim to gain caregiver attention and proximity in times of distress. The parent – infant bond is understood to be an evolved response that promotes survival: an attachment system has evolved for infants to sustain proximity with their primary caregiver during times of threat. Bowlby (1982) described the typical cycle of attachment system activation and deactivation. The goal of the system is a sense of protection or security, the system is activated in times

of distress and deactivated when felt security is achieved. Over time, the goal of the attachment system develops so that infants and primary caregivers sustain proximity in order for the child to develop a sense of “felt security” (Ainsworth, Blehar, Waters & Wall, 1978). Attachment figures are therefore used as a ‘secure base’ from which to explore the world and a ‘safe – haven’ in times of distress (Ainsworth, 1989; Bowlby, 1969; Daniel, 2006). Infants therefore develop a lasting affectionate bond with their caregivers which are used as a secure base in the parent’s absence.

The quality of infant – caregiver attachment bonds vary according to the nature of the infant – caregiver interactions, particularly the availability and responsiveness of attachment figures. Therefore children demonstrate individual differences in patterns of attachment (Ainsworth et al., 1978). Gradually, children internalise their experiences with attachment figures so that early attachment relationships form prototypes for later relationships (Bowlby, 1973). This internalisation of experiences forms the internal working model – a set of expectations about the availability of attachment figures and their likelihood of providing support during distress (model of ‘others’) and whether the self is typically judged to be worthy of attention and love (Bartholomew & Horowitz, 1991; Bowlby, 1973). If a child experiences their attachment figure(s) as accessible, receptive in times of need and capable of relieving their distress, they will internalise beliefs of the world as a safe place, others as caring and reliable and themselves as worthy of love. Consequently, they will feel secure enough to independently explore their environment. This positive internal working model of the self and of others is termed ‘attachment security’ (Bowlby, 1988). Due to the innate nature of the ‘attachment behavioural system’, infants develop an attachment to caregivers even if they do not provide the security sought after (Daniel, 2006). If the attachment figure is unresponsive and unavailable, the child will

alter their attachment behaviour with the aim of acquiring whatever approximation of security is achievable (Bowlby, 1988; Daniel, 2006; Main, 1995). The child will also develop a predominantly negative working model of themselves and others. These negative working models will manifest themselves in either avoidant, or anxious attachment behaviours.

In their seminal research, Ainsworth et al. (1978) developed a methodology of investigating differences in the quality of the attachment bond. This 'Strange Situation' constituted the experimental separation and reunion of infants and their mothers. By observing the infant – mother interaction and the child's emotional reactions to separation and reunion, Ainsworth et al. (1978) identified three distinct patterns of attachment behaviour; *secure*, *anxious/ambivalent* and *avoidant*. Children labelled as *secure* tended to use their parent as a secure base for exploration, missed them on separation and sought then gained reassurance on the parents' return. Children deemed *insecure – ambivalent* were fixated on their parent and were incapable of exploring their environment. They were typically upset when their parent left the room but were unable to be comforted when they returned, instead displaying angry or passive behaviour. Finally those children labelled *insecure – avoidant* tended to explore their environment without utilising their parent as a secure base and ignored parent separation and reunion. Because infant's reaction to the Strange Situation closely resembles the child's use of the parent as a secure base and their responses to separation and reunion at home, the Strange Situation is deemed to be a valid methodological tool for assessing childhood attachment patterns.

Attachment in adulthood

A basic principle of attachment theory is that attachment relationships continue to be significant throughout the lifespan (Ainsworth, 1982, 1989; Bowlby, 1977, 1980, 1982).

Even though the attachment behavioural system is most apparent early in life, Bowlby (1988) maintained it is active in adulthood and manifests in thoughts and behaviours related to seeking closeness to attachment figures during times of threat or need. Furthermore, the internal working model endures and updates throughout the lifespan, serving as a guide for all future close relationships (Bretherton & Munholland, 1999). Adult attachment patterns are thought to be relatively stable, because each new experience is assimilated to the existing working model, and because the patterns give rise to self – perpetuating interactional behaviours.

Hazan and Shaver (1987) were the first to conceptualise adult romantic relationships in the context of attachment theory and develop a self – report measure to classify adults into attachment categories. It was proposed romantic love is an attachment process, specifically a biosocial process, experienced differently by everyone because of individual differences in attachment histories. The process of love and attachment to a romantic partner is theorised to stem from the same attachment behavioural system underpinning attachment patterns in childhood. Hazan and Shaver proposed three prototypes of adult attachment comparable to the three major styles of attachment in infancy: secure, avoidant and anxious/ambivalent (Ainsworth et al., 1978). The secure attachment style is exemplified by a general comfort with intimacy without a fear of abandonment or rejection. The avoidant style is characterised by a dislike of emotional intimacy and a fear that others wish to be closer than they would like. The ambivalent style is described as having a fear of rejection and a preoccupation on the attachment relationship. Just as in childhood, the expression of different patterns of attachment is dependent on the individual's internal working models of the self and of others, which are deemed to be a product of the infant – parent interaction and attachment relationship.

Bartholomew and Horowitz (1991) proposed a two dimensional, four category conceptual framework of adult attachment, defined using Bowlby's (1973) conceptualisation of the internal working model of the self and others. For Bartholomew and Horowitz, a four category model is a logical derivative of the combinations the two levels of self (positive and negative) and other (positive and negative) working models. According to this view, an individual's image of the self is dichotomised as positive or negative; the self is worthy of love or it is not. The individual's view of other people is also dichotomised as positive or negative; others are dependable and trustworthy or untrustworthy and rejecting (Bartholomew & Horowitz, 1991). Combining all possible patterns of self and other working models therefore results in four attachment prototypes: *Secure, preoccupied, dismissing - avoidant and fearful - avoidant*. Persons holding a positive model of the self and a positive model of others have a sense of worthiness, see others as dependable and are typically comfortable with intimacy. Such a person is deemed to have a *secure* attachment pattern. Those with a negative view of the self as unlovable and a positive view of others tend to strive for self – acceptance by obtaining positive evaluations and approval from other valued people. This elicits a preoccupation with relationships, and is therefore termed *preoccupied* attachment. This pattern also corresponds to Hazan and Shaver's (1987) ambivalent group. Individuals with a negative view of the self and a negative view of others tend to avoid getting close to others in an attempt to avoid anticipated rejection. This *fearful - avoidant* attachment pattern corresponds with Hazan and Shaver's (1987) *avoidant* group. The final combination is a positive view of the self and a negative view of others in which the individual avoids anticipated disappointment by avoiding others and maintains a sense of independence. This is labelled the *dismissing – avoidant* attachment style. The four category model outlined by

Bartholomew and Horowitz (1991) was the first model of adult attachment to differentiate between two types of avoidance (dismissive and fearful).

Both the models of attachment proposed by Hazan and Shaver (1987) and Bartholomew and Horowitz (1991) classify individuals as belonging to discrete categories of attachment style. However, these categorical models have suffered criticism for assuming variations amongst people within a category do not exist, regardless of the fact that individual differences have been observed in clinical practice (Mikulincer & Shaver, 2007a; Smith et al., 2010). Furthermore research has indicated that attachment variation does not necessarily match a taxonic model (Meehl, 1995; Waller & Meehl, 1998). Fraley and Waller (1998) maintain that enforcing categorical models onto attachment variability can produce problems with statistical power and measurement accuracy.

More contemporary research has provided evidence for the conceptualisation of attachment in terms of two dimensions: *attachment – related anxiety* and *attachment – related avoidance* (Brennan, Clark and Shaver, 1998; Fraley & Waller, 1998). Brennan et al. (1998) factor analysed a number of self – report measures of adult attachment and found items loaded onto two orthogonal dimensions (*anxiety* and *avoidance*). The result of these findings was the development of the Experiences in Close Relationships Scale (ECR; Brennan et al., 1998), a 36 item self – report questionnaire measuring adult attachment. Individuals who score highly on *attachment anxiety* typically feel an excessive need for approval, fear abandonment and worry about whether their partner is responsive and available. People low on this dimension exhibit less of a preoccupation with the responsiveness of their partner and do not seek excessive amounts of approval from others. Those scoring highly on *attachment avoidance* tend to possess an excessive need for self-reliance and the fear of depending on others. People scoring low on this dimension are

more comfortable depending on others. Individuals low on both dimensions are prototypically *secure*. Combinations of scores on the two attachment dimensions produce four “adult attachment orientations” (Bartholomew, 1990) mirroring those of Bartholomew and Horowitz (1991). Individuals scoring low on attachment *avoidance* and *anxiety* are deemed to be *secure*. People scoring high on anxiety and low on avoidance are considered to be *preoccupied*, those scoring high on avoidance and low on anxiety are classified as *dismissing* and people scoring high on avoidance and high on anxiety are thought to have a *fearful* attachment style. However, as discussed, there is general agreement that adult attachment should be regarded as dimensional rather than categorical. (Fraley & Waller, 1998). Hence, Brennan et al. (1998) present the ECR as a measure of adult attachment using the dimensions of *avoidance* and *anxiety* with the ability to translate people’s location on the two dimensions in terms of Bartholomew and Horowitz’s (1991) prototypes if necessary.

Attachment orientation and psychotherapy

The adult attachment system is believed to be activated in times of distress, which is particularly relevant to times when people seek psychological help. Bowlby (1988) asserted that the therapeutic relationship also constitutes features which trigger a client's attachment expectations and behaviours. Akin to a caregiver, the therapist provides emotional availability, a comforting presence and a secure base from which to explore the difficult aspects of their life (Pistole, 1989). Consequently, the therapist assumes the role of an adult attachment figure and the therapeutic relationship is a specific type of adult attachment (Mallinckrodt, Gantt & Coble, 1995). This therapeutic relationship is believed to be affected by a client's childhood attachment history (Bowlby, 1988). Adult attachment

patterns exert their influence on the therapeutic process through the client's internal working model of the self (anxiety) and others (avoidance).

Attachment orientation and help seeking

Adult attachment systems are activated in times of distress (Bowlby, 1973), and therefore attachment styles have been identified as an individual – differences variable which influences help – seeking (Lopez, Melendez, Saurer, Berger & Wyssmann, 1998). Specifically, activation of a dispositional insecure attachment pattern hinders an individual seeking professional help (Florian, Mikulincer & Bucholtz, 1995; Hazan & Shaver, 1987). Due to the propensity of insecurely attached individuals to view others as unreliable and untrustworthy, this naturally impedes their desire to seek help from others (Wallace & Vaux, 1993). Sarason, Pierce and Sarason (1990) maintain that as individuals high on attachment anxiety see others positively, they accentuate their distress to try to gain help from other people. Conversely individuals high on attachment avoidance hold a negative view of others, and therefore devalue the importance of others, preferring to sustain emotional distance as a way of avoiding depending on others for help (Cassidy, 1994; 2000; Sarason et al., 1990). Indeed, evidence has demonstrated individuals high on attachment insecurity show less help – seeking behaviour (DeFronzo, Panzarella & Butler, 2001). This would suggest that attachment avoidance may obstruct a person from seeking psychological help, whereas attachment anxiety may be related to greater willingness to recognise their own distress and seek psychological help. Several studies offer empirical support for these assertions.

Lopez et al., (1998) investigated the help seeking attitudes amongst college students and results showed participants high on attachment avoidance were less likely to seek therapy than those high on attachment anxiety. Dozier (1990) studied 42 psychiatric

patients receiving treatment and found patients with avoidance were most likely to reject the treatment offered. Vogel and Wei (2005) used a questionnaire based study to demonstrate that individuals with attachment avoidance were less likely to seek help and individuals with attachment anxiety were more likely to seek professional help. Furthermore this effect was mediated by willingness to acknowledge distress. Individuals with attachment anxiety were more likely to acknowledge the psychological distress they experienced, which then increased the likelihood of their seeking professional help. Individuals with higher levels of attachment avoidance tend to be reluctant to acknowledge their distress or even deny it completely. Overall then, it appears adult attachment styles play a significant role in help seeking intent and behaviours.

In traditional, face to face therapies, adult attachment plays a number of important roles, but it is still not known how, or if the relationship between adult attachment styles and help – seeking intent play out in the context of CCBT. Are adult attachment patterns related to pre – treatment attitudes, treatment credibility and treatment expectancy? These questions will be investigated in Chapter 3.

Attachment styles and the therapeutic alliance

Bowlby (1988) maintained that the therapeutic relationship is a special form of adult attachment which features many components that trigger client attachment related beliefs and behaviours. As such client attachment styles are expected to influence the therapeutic alliance formed with therapists. In psychotherapy, the therapeutic alliance refers to the interpersonal processes that transpire between a client and therapist (Smith et al., 2010). It is understood that clients project their internal working models onto both the therapist and the therapeutic relationship, affecting how the client and therapist interact and in turn the formation of the therapeutic alliance (Bowlby, 1988; Smith et al., 2010). Clients high in

attachment security have a positive view of both the self and of others, viewing themselves as worthy of love and others as reliable and trustworthy. They are therefore better able to self – disclose and cultivate a collaborative understanding with the therapist (Mikulincer & Nachshon, 1991), resulting in the formation and maintenance of a good quality therapeutic alliance (Smith et al., 2010). Clients high on attachment insecurity evade emotional intimacy (highly avoidant) resulting in a reluctance to engage in meaningful self – disclosure, or may be highly worried about the availability of their therapist and become preoccupied with maintaining the therapeutic relationship (highly anxious). Both of these tendencies would disrupt the formation of a good quality therapeutic alliance (Smith et al., 2010).

Research has illustrated an association between adult attachment styles and in – treatment behaviours including the therapeutic alliance. Highly secure individuals tend to demonstrate higher willingness to accept help, higher treatment compliance, and higher levels of emotional commitment to therapy and are better at self – disclosure. As such highly secure individuals are able to form good quality therapeutic alliances. Individuals high on attachment anxiety are good at acknowledging their own distress and go to lengths to seek help from others. They are very comfortable with self – disclosure but hold a preoccupation with the therapeutic relationship. Individuals high on attachment avoidance demonstrate unwillingness to meaningfully self – disclose or become emotionally committed to therapy and possess a tendency to become self – reliant in therapy (Dozier, 1990; Korfmaier, Adam, Ogawa & Egeland, 1997; Mikulincer & Nachshon, 1991).

Bowlby (1988, 1982) described the role of the therapist as parallel to that of an attachment figure who offers both a “secure base” from which to explore the client’s difficulties and a “safe haven” of reassurance and comfort when the client is distressed.

Therefore, not only are attachment patterns expected to influence the working therapeutic relationship between the client and therapist, it is also expected to effect the emotional, attachment bond the client develops towards their therapist. According to Mallinckrodt et al. (1995) who developed the Client Attachment to Therapist Scale (CATS), the therapeutic attachment may be classified as either *Secure* (clients view their therapists as emotionally accessible), *Avoidant – Fearful* (clients feel threatened and disapproved of by their therapist) and *Preoccupied – Merger* (clients are over – dependent on their therapist and have a strong desire to feel closer to them). Consistent with expectations from attachment theory, Mallinckrodt et al. (1995) demonstrated positive correlations between client secure attachment and the therapeutic alliance. Participants who scored high on the preoccupied – merger subscale quickly formed a strong bond with their therapist but found it harder to agree on goals and tasks in therapy. Participants scoring high on the avoidant – fearful subscale reported the poorest therapeutic alliances.

While a significant body of research has explored the role of adult attachment in the therapeutic alliance in face to face therapy, the role of adult attachment in other therapeutic contexts, including low intensity interventions like CCBT, has barely been explored. Given the diminished role of the therapist in online and computerised CBT formats it is necessary to explore whether the idea of a therapeutic alliance is valid in CCBT. Furthermore, does this differ between guided CCBT interventions and fully automated unguided CCBT interventions in which there is no face to face human contact? These questions are investigated and discussed in Chapter 4.

Attachment security priming

It appears then that individuals high on attachment security hold internal working models that permit them to form good quality attachments and therapeutic alliances with

their therapists which may promote greater benefits from therapy. However evidence suggests that insecure attachment styles are related to an increased risk of psychopathology (Daniel, 2006). Therefore, there is a high probability that clients entering psychotherapy possess insecure attachment patterns.

There is a growing body of evidence to suggest that experimentally increasing mental accessibility of attachment security related memories ('security priming') significantly increases a sense of 'felt security' (Carnelley & Rowe, 2007, 2010; Luke, Sedikides & Carnelley, 2010; Mikulincer & Shaver, 2001; Rowe & Carnelley, 2003). The notion is that priming security associated memories is figuratively equivalent to attachment figure exposure, creating positive effects mirroring those of dispositional attachment security (Carnelley & Rowe, 2010). Security priming is proposed to work by spreading activation, effectively overriding the dispositional attachment style of the individual (Klauer & Musch, 2003).

Evidence supports the positive effects of priming attachment security on mood and mental health, for example several subliminal and supraliminal security priming techniques have been demonstrated to boost positive mood (Mikulincer, Hirschberger, Nachmias, & Gillath, 2001; Mikulincer, Gillath, et al., 2003; Mikulincer & Shaver, 2001). However, sparse research is currently available on the benefits of priming attachment security on the therapeutic relationship, therapeutic attachment or the process of psychotherapy in general. Given the volume of evidence illustrating attachment priming reliably promotes a sense of felt security, the potential for security priming to enhance the therapeutic engagement and the therapeutic relationship is deserving of investigation. Furthermore, given concerns about the therapeutic relationship in CCBT (Chu et al., 2004; Macneil et al., 2009) and the problem of attrition in the field of e – health interventions (Eysenbach, 2005) an

investigation into the potential benefits of security priming on experiences using CCBT is timely. Chapter 5 will therefore discuss and explore the potential benefits of security priming on experience of using CCBT, by experimentally priming attachment security in a laboratory setting.

1.8. Overview of the thesis

Aims and justification. It is evident that the high prevalence of CMHDs is a major global health issue associated with considerable economic and personal costs (NICE, 2011a, WHO, 2013). Simultaneously, there exists a substantial unmet need for help, on both a national and global level (DOH, 2008; WHO, 2013). Computerised cognitive behavioural therapy offers a promising and effective way to help increase access to CBT, an evidence based, psychological treatment for mood and anxiety disorders (Andersson, 2010). CCBT can deliver the well delineated treatment techniques of CBT in a standardised fashion to a wide population. CCBT also has the potential to help overcome some of the barriers associated with accessing traditional CBT, while increasing the capacity of current mental health services to meet demand (Marks et al., 2007). Yet, despite the number of studies exploring the effectiveness of CCBT, much less is understood about the realities of its dissemination outside of research trials (Andersson, 2010). Indeed, concerns regarding engagement and attrition often result in study designs which are not fully representative of real world situations (Doherty et al., 2012). What is understood however, is that issues impeding widespread implementation can include concerns about acceptability (Whitfield & Williams, 2004), engagement (Eysenbach, 2005) and the role of the therapeutic alliance in CCBT (Helgadóttir et al., 2009; Macleod et al., 2009).

These issues cannot simply be solved by escalating amounts of human support as this would increase logistical difficulties, costs, resource requirements (Doherty et al., 2012) and would ultimately run counter to the purpose of low intensity interventions. It is therefore imperative to explore other variables which may serve to overcome these barriers to implementation. There is a paucity of research investigating the factors influencing these implementation issues in CCBT; therefore a multidisciplinary approach is advocated. Dispositional adult attachment has consistently been evidenced to influence traditional therapeutic processes (Dozier, 1990; Smith et al., 2010). Therefore the empirical studies presented in this thesis focus on whether these same associations are evident when applied to CCBT, where the therapeutic process is conducted primarily in a human – computer interaction, rather than a client – therapist dyad.

The broad aim of this thesis is therefore to investigate implementation issues and the factors which may influence them. Specific aims are;

1. To evaluate the current evidence for the effectiveness of CCBT for the range of CMHDs and to assess the moderators of these effects. Chapter 2 presents a meta-analysis and systematic review of randomised controlled trials.
2. To review the current evidence concerning engagement with CCBT programs and the factors associated with program uptake and dropout. Chapter 3 presents a systematic review of CCBT trials and synthesises study data to analyse the factors associated with engagement. This chapter also presents a model of engagement with CCBT which is then tested in the following empirical studies.

3. To provide a contemporary depiction of the acceptability of CCBT in a student population and to determine whether dispositional adult attachment styles are associated with acceptability (Chapter 4; empirical study 1).
4. To investigate whether adult attachment is associated with engagement and the therapeutic alliance with CCBT in vivo. Chapter 5, studies 2a and 2b investigate this question in regards to guided CCBT (Study 2a) and unguided CCBT (Study 2b) in settings designed to reflect the real world implementation of these programs.
5. To explore whether priming a sense of felt security (security priming) will improve engagement and therapeutic alliances in unguided CCBT compared to neutral primes (Chapter 6, Study 3).

Given the fact that less than one third of those who suffer psychological distress actively seek help from a mental health professional (Andrews, Issakidis, & Carter, 2001), there is a need for researchers and clinicians to develop an understanding of the individual differences that contribute to a person's decision to seek professional help, in order to reach out to those who need services (Komiya, Good, & Sherrod, 2000). No prior research has investigated how adult attachment may influence attitudes towards CCBT, or how attachment styles play out in the context of CCBT self – help. Interpersonal variables influencing an individual's decision to seek out and stay in treatment need to be better understood in order to optimise services and tailor services to reach hard to engage groups. Study 3 also represents the first known application of security priming techniques to CCBT and more broadly speaking, the first application of security priming in a therapeutic context. By drawing together concepts from attachment theory and human – computer interaction, it is possible to explore the relational nature of CCBT programs and whether or not

implementation issues can be addressed by targeting specific groups based on their dispositional attachment style or by such techniques as attachment security priming.

1.9. A consideration on hypotheses

Given the absence of previous research focusing on the influence of adult attachment on CCBT use, it would be premature to propose the associations evident in traditional therapies will differ in CCBT. Firstly, there is no empirical basis to assume the adult attachment system would not be activated in the context of CCBT. The attachment system is activated by physical or psychological threats (Bowlby, 1973) and by close relationships that elicit the potential for love, safety and reassurance (Ainsworth, 1989). Psychological distress, as experienced when suffering from a CMHD would invariably lead to attachment system activation. Furthermore, Bowlby (1988) maintained that the therapeutic relationship also contains features which may trigger the adult attachment system. In the context of CCBT, the attachment system may also be activated by common features embedded within the program designed to build a therapeutic relationship.

Although the therapeutic process unfolds in a human – computer interaction as opposed to a client – therapist dyad, CCBT is similar to CBT in a number of ways. CCBT may activate both specific and common factors in the same way that traditional, face to face therapy can activate them (Peck, 2010). CCBT constitutes the same CBT specific treatment techniques of face to face CBT and preliminary evidence suggests CCBT incorporates common factors, such as features designed to establish a therapeutic alliance (Barazzzone et al., 2012). Many CCBT programs are designed as ‘modules’ which are analogous to a session of CBT and the available evidence has highlighted CCBT can be as effective as face to face CBT (Carlbring et al., 2003; Greist et al., 2002). It is therefore hypothesised

that is the association between adult attachment styles and CCBT will mirror that which is evident in traditional face to face therapies. Each empirical study will present study specific hypothesis in detail.

Chapter 2

Computerised cognitive behavioural therapy for common mental health disorders, what works, for whom under what circumstances? A systematic review and meta-analysis¹³

2.1. Introduction

Depression and anxiety affect more than one in six people at any one time (ONS, 2009). These serious conditions are so prevalent, they have been conceptualised as ‘common mental health disorders’ (NICE, 2011a). Cognitive Behavioural Therapy (CBT) has consistently been shown to be an effective intervention for common mental health disorders (e.g. Shafran et al., 2009). However, there exists a large treatment versus demand gap for CBT (Shafran et al., 2009). This may be due to several factors including limited availability, indicated by a shortage and inequitable distribution of CBT therapists (Cavanagh, 2013), significant waiting times (Kaltenthaler, Parry et al., 2008), and accessibility marked by cost.

Addressing the unmet need for evidence-based psychological interventions like CBT has now become a priority to both the National Institute of Mental Health based in the USA (Insel, 2009) and NICE based in the United Kingdom. In 2007 the United Kingdom government supported an ongoing ‘Improving Access to Psychological Therapies’ (IAPT) initiative to disseminate evidence-based psychological interventions beginning with a focus on treating anxiety and depression. This initiative is delivered via a ‘stepped model of care’

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in which ‘the least intrusive, most effective intervention is provided first’ (NICE, 2009a, p.16). In the stepped care model ‘low intensity’ psychological interventions, aimed at individuals suffering mild to moderate depression or anxiety, include guided self-help based on the principles cognitive behavioural therapy (CBT), in both book and computerised formats (NICE, 2009a; NICE 2011a).

Computerised CBT (CCBT) is a form of CBT that is delivered via an interactive computer interface, for example by an offline personal computer (PC) programme, or the internet. CCBT can either be supported by trained coaches or health professionals (‘guided’ CCBT) or with no supplementary therapeutic support (‘unguided’ CCBT). Delivery of an effective evidence based treatment such as CBT via a computer may offer a range of potential benefits including increased reach, availability and rapid access to a consistent, cost-effective treatment, which is available 24 hours a day. The dissemination of CCBT may be associated with reduced service waiting times, and attractive to potential users who can work at their own pace, without stigma and no requirement to take time off work (Andrews, 2010; Marks & Cavanagh, 2009; Marks, Cavanagh, & Gega, 2007).

There is a growing evidence base to support the application of CCBT interventions for the treatment of depression (Foroushani et al., 2011) and anxiety (e.g. Cuijpers et al., 2009). Previous meta-analyses of computerised and internet CBT have typically shown significant heterogeneity between studies (Andersson & Cuijpers, 2009; Cuijpers et al., 2009; Spek et al., 2007), yet relatively few have concentrated on moderators of their effects. Such analysis will help to improve our understanding of not just whether CCBT works, but for whom and under what circumstances (Roth & Fonagy, 2004).

Drawing from previous psychotherapy research and individual studies that have explored potential moderators of CCBT’s effect, a number of variables may influence both

the clinical effectiveness and acceptability of CCBT (Kaltenthaler et al., 2006). These include person (demographic factors, biopsychosocial characteristics), problem (type of problem, severity, and chronicity), program (CCBT content and process factors) and provider (how much support, provided by whom, where and how) factors that may each independently and interactively moderate the effect of CCBT (Cavanagh & Millings, 2013b).

The aim of this meta-analysis was twofold. First, to provide a current and comprehensive overview of the effectiveness of CCBT programs for the treatment of CMHDs as defined by NICE (2011a). Second to explore the range of measured variables that could moderate this effect, including study characteristics, participant demographic data, type of problem, treatment access, study referral and additional support. An understanding of the moderators of CCBT effectiveness has the potential to allow improved design of programs and dissemination procedures which will in turn have a positive influence on the public health impact of CCBT.

2.2. Methods

Identification and Selection of Studies

This review was undertaken as outlined by NHS best practice guidelines (NHS Centre for Reviews and Dissemination, 2001). Six electronic databases were searched: ASSIA, PsychArticles, PsychInfo, Science Direct, Scopus and Web of Knowledge. The search covered years 1966 to April 2013 in the fields of computer science, medicine, and health professions, psychology and social sciences. Reference lists of articles were searched for further relevant studies. Search terms included variations (both grammatical and abbreviations) on the words computerised cognitive behavioural therapy (CBT), CCBT, internet – based CBT, internet delivered CBT and web – based CBT. These terms were intended to capture studies utilising either offline or internet interventions that were self-guided or offered with some human support. Studies were included if they evaluated interventions based on the principles of CBT and were designed to “create positive change and or improve/enhance knowledge, awareness, and understanding via the provision of sound health-related material and use of interactive [web-based] components” (Barak et al., 2009, p. 5). Next the search included population terms; depression (including sub-threshold disorders), anxiety, phobia, social anxiety disorder, GAD, panic disorder, OCD and PTSD. Names of CCBT programs were also searched including Beating the Blues, MoodGYM, Living Life to the Full, COPE and Colour Your Life. Through this method a total of 2,280 published papers were identified for possible inclusion in the review. Figure 2.1 illustrates review process and the number of papers excluded at each stage.

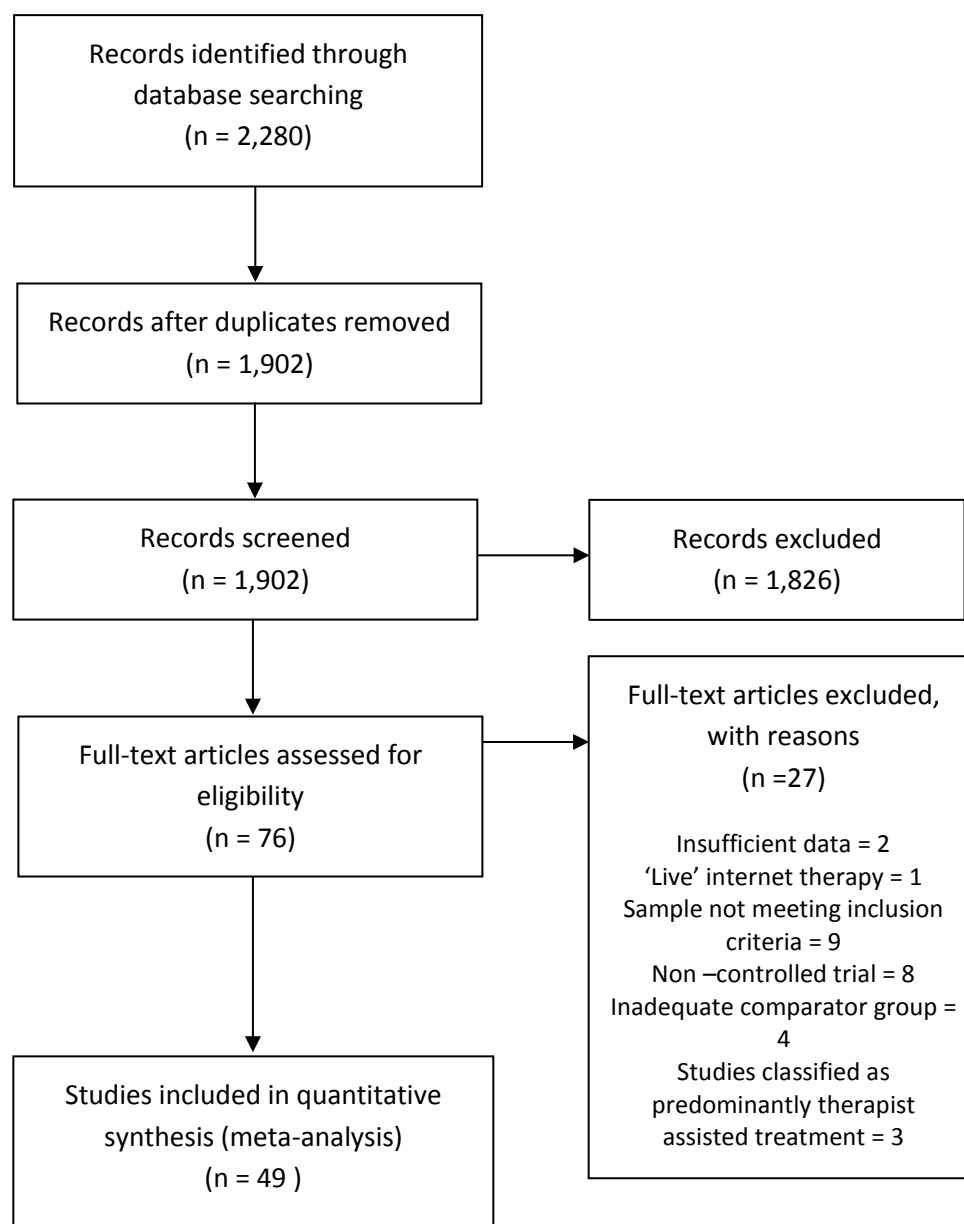


Figure 2.1. PRISMA study flow diagram.

Inclusion criteria. (1) A study population of adults (> 16 years), (2) a study population with common mental health disorders (identified by researcher or health-professional). No restrictions were imposed on the severity of disorders, chronicity, or co-morbidity with other CMHDs.(3) A study intervention based on the principles of CBT and accessed via the internet or computer program. (4) A study intervention which met the criteria for one of three types of self-help described by Newman et al. (2011): self-administered therapy (SA; therapist contact for assessment at most), predominantly self-help (PSH; therapist contact for purposes of check ins and providing therapeutic rationale, that does not involve more than 90 minutes of therapist time) or minimal contact therapy (MCT; active participation of therapist to help the client apply specific therapeutic techniques, though a lesser degree than in traditional therapy, involving more than 90 minutes of the therapists time). (5) Study included quantitative outcome measures of CMHD symptoms, and (6) a randomised controlled trial design.

Exclusion criteria. (1) Studies using only book-based self-help, (2) studies using computer based features to augment or extend CBT (e.g. virtual reality and online counselling), (3) studies of interventions using only interactive voice response technologies, (4) studies of predominantly therapist administered treatments (TA) according to the Newman et al. (2011) criteria where CCBT augments traditional therapy and therapist input is substantial. (5) Studies with populations for whom psychotic and related disorders, eating disorders, drug and alcohol misuse were the primary focus of the intervention, (6) systematic reviews or meta analyses, (7) studies presenting inadequate information to compute an effect size from a primary outcome variable, and (8) RCTs which investigated the effectiveness only of one type of CCBT compared to another.

Data Coding

For the primary analysis, extracted variables were the means and standard deviations on the primary outcome measure of CMHD symptoms at post intervention. One effect size from the primary outcome measure was coded from each study. For studies in which more than one measurement of the key outcome variable was employed the most psychometrically valid and reliable self – report measure was preferred. One effect size was calculated per study and for studies which included two or more control groups, data from the active control was extracted.

Information on engagement metrics included the number and percentage of those showing initial interest in the study who commenced the study (uptake), and the number and percentage of participants who dropped out of both the CCBT condition and control conditions (drop-out). For the moderator analyses measures of study characteristics, participant demographic data, type of problem, treatment access, study referral and therapist guidance and information about study quality were extracted and coded.

Study Quality

RCT quality was assessed according to the Cochrane Collaboration's tool for assessing risk of bias. Studies were assigned either low risk, unclear risk or high risk status regarding selection bias, performance bias, detection bias, attrition bias, reporting bias and final "other" category of identifiable biases. Assigning low risk a value of one, unclear risk a value of two and high risk a value of three yielded a final 'risk of bias' score for each study out of 21. A higher score indicated a higher the risk of bias and poorer methodological quality.

Statistical Analysis

For each study the effect size Hedges' g was calculated by deducting the mean of the intervention group from the mean of the control group at post intervention, dividing by the pooled standard deviation and adjusting for small sample bias (Hedges & Vevea, 1996). The statistical software package Review Manager Version 5.1 (Review Manager, The Cochrane Collaboration, 2011) was utilised to conduct the initial meta-analysis. To calculate heterogeneity of effect sizes the Q statistic and I^2 statistic were used. A significant Q statistic implies significant heterogeneity indicating more variation in effect sizes than can be attributed to chance alone. The I^2 statistic expresses the heterogeneity as a percentage, with values of 25% associated with low heterogeneity, 50% moderate and 75% high heterogeneity (Crombie & Davis, 2009). Review Manager can conduct sub – group analysis based on categorical variables but in order to determine whether effect sizes significantly differed according to categorical and continuous variables, separate moderator variable analyses needed to be conducted using SPSS and a syntax file written by Field and Gillett (2010). This syntax file uses multiple weighted regressions to yield a calculation of the influence of continuous and categorical variables on effect sizes. For continuous variables the syntax yields a regression coefficient expressing the relationship between the moderator and effect size. For categorical variables the syntax expresses whether a difference in effect sizes exists based on categorical groupings. See Appendix B for the main syntax for these analyses.

2.3. Results

A total of 49 randomized controlled trials were included in the final meta-analysis. An overall meta-analysis was conducted on all RCTs to determine the effectiveness of CCBT for the treatment of CMHD and moderator analyses conducted to examine the moderators of this effect. Selected study characteristics are reported in Appendix A. A large number of people showed initial interest in the research trials or were invited to take part ($N = 44,943$). Of this number, 5,503 were randomized into a trial condition: this equates to 12.24 % uptake rate for this sample. A total of 2,340 participants were randomized into CCBT treatment arms, 2,201 were randomized into control interventions and the remaining 962 participants had been randomized into a third or fourth arm of the RCT. Of the 2,201 assigned to control conditions, 814 were allocated to inactive waitlist conditions and 1,387 to active control conditions. Sixteen studies used RCT designs in which there was more than one control condition. One control condition was selected from each study to be included in this meta-analysis, active control conditions were preferred over an inactive control conditions.

645 out of 2,340 (28 %) participants dropped out of CCBT treatment arms, 409 out of 2,201 (19 %) participants dropped out of the selected control conditions. A repeated measures t test indicated a significant difference between attrition from intervention groups and attrition from control groups across studies: $t(47) = 3.60, p < .001$). Specifically, attrition from CCBT treatment groups ($M = 28.17, SD = 20.67$) was significantly higher than attrition from control groups ($M = 16.91, SD = 20.08$). Whilst drop out from CCBT treatment groups was significantly greater than in inactive control groups ($t(24) = 4.11, p$

< .001), no difference between drop out from CCBT and active control conditions was found ($t(20) = 1.55, p = .14$).

Study Characteristics

Participant characteristics. Details of participant demographics in each study are presented in Table A1 (see Appendix A). The mean age of study participants was 38.65 years ($S.D = 6.2$). Two-thirds (68%) of study participants were female, and half (53%) had completed tertiary education. Where reported, 39% of participants were taking psychotropic medication to treat the CMHD during the research trial and 56% had some previous treatment history for the CMHD of focus. Eighteen out of 49 (37%) studies did not report details of participant's educational background, 14 studies (29 %) did not report details of participant use of medication and 23 studies (47 %) did not report any details of participants' treatment history.

CMHD characteristics. The majority of studies focused on anxiety disorders ($N = 34, 69\%$) including Panic Disorder ($N = 11, 22\%$), Social Phobia ($N = 7, 14\%$), Generalised Anxiety Disorder ($N = 5, 10\%$), Social Anxiety Disorder ($N = 4, 8\%$), Anxiety Disorder unspecified ($N = 3, 6\%$), PTSD ($N = 2, 4\%$), and OCD ($N = 1, 2\%$) Depression was the focus of 14 studies (29 %). Where studies included transdiagnostic programs for depression and anxiety ($N = 2$) these studies were coded as focusing mainly on depression or mainly on anxiety disorders based on the predominant primary presenting problem of the participants in each study This was required in order to conduct subsequent moderator analysis.

Program characteristics. Table A1 (Appendix A) illustrates details of CCBT programs. Interventions included Beating the Blues ($N = 2$), MoodGYM ($N = 2$), Color

Your Life ($N = 1$), Panic Online ($N = 3$), DE-STRESS ($N = 1$), FearFighter ($N = 1$), Coping With Depression ($N = 2$), The Wellbeing Program ($N = 1$), Talk to Me ($N = 2$), Brighten Your Mood ($N = 1$), The Anxiety Program ($N = 1$), The Worry Program ($N = 3$), The PTSD Program ($N = 1$), The Panic Program ($N = 1$), The Sadness Program ($N = 2$) and The Shyness program ($N = 3$). Twenty – two studies (45 %) reported trials of programs with no name or title. The majority of studies reported using programs which were accessed via the internet ($N = 46$, 94 %). The remaining studies reported using programs only accessible on computers located at the study site ($N = 3$, 6 %), located in either a research laboratory ($N = 1$) or healthcare setting ($N = 2$).

Provider characteristics.

Referral. Forty two (86%) studies recruited participants who had self-referred into the study. The remaining 7 (14%) of the studies recruited participants who had been referred via health care professionals. These professional referrals included general practitioner referrals ($N = 2$), health professionals ($N = 3$) and professionals in the US department of defence ($N = 1$). One study did not report the specific health professional who referred participants into the study (Hedman et al., 2011).

Support. Studies were coded according to criteria for three types of self-help based on the quantity of therapist contact for the intervention (Newman et al., 2011). Six study interventions (12 %) were defined as self-administered therapy (SA, no therapist contact), fourteen study interventions (29 %) included predominantly self-help (PSH, < 90 minutes contact) and 29 studies (60 %) reported on interventions minimal contact therapies (MCT, 50%, > 90 minutes contact). Any studies classified as predominantly therapist administered treatment (TA, where CCBT

augments a full programme of standard contact therapy) were excluded before analysis ($N = 3$). Of the 43 studies of guided CCBT the mean total time spent on each participant throughout the intervention was 105.68 minutes ($S.D = 79.66$). The majority of support was provided remotely ($N = 39$, 80 %), via email ($N = 21$, 43% email and phone combined ($N = 11$, 22 %), phone only ($N = 2$, 4%), email and posting on a web forum ($N = 3$, 6%) posting on a website ($N = 1$, 2 %) or instant messaging, phone and email combined ($N = 1$, 2%) The remaining four studies provided support in person ($N = 4$, 8%).

Effectiveness

A meta-analysis compared CCBT and control conditions on CMHD scores on primary symptom outcome measure post intervention. The overall mean effect size was $g = 0.77$, 95 % CI [0.59 – 0.95] according to a random effects model. This effect size is medium according to Cohen's (1992) criteria. The associated Z score indicated this effect size was highly significant ($z = 8.45$, $p < .001$). Heterogeneity was high ($I^2 = 87$ %) and statistically significant ($Q = 358.81$ (48), $p < .001$). When faced with significant heterogeneity it is appropriate to assume a Random Effects Model (REM, Field and Gillett 2010) as such, REM results are reported. The results of this meta-analysis are illustrated in a forest plot (Figure 2.2).

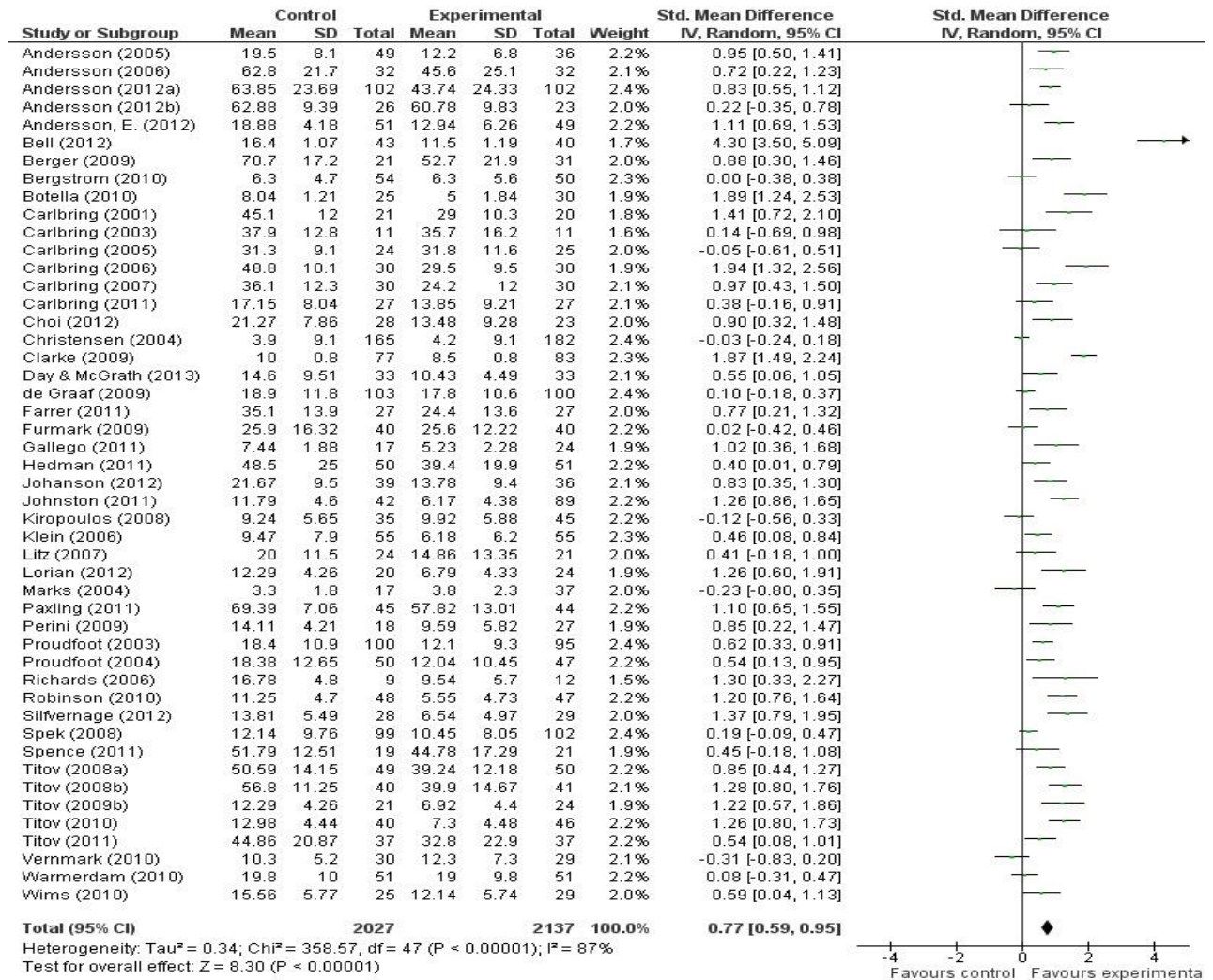


Figure 2.2. Forest plot illustrating the effect of computerised cognitive behavioural therapy for common mental health disorders compared to control groups. The forest plot shows the standardized mean difference and a randomized effects model.

Publication Bias

To assess the threat of publication bias Rosenthal's (1979) file-drawer analysis was applied. Rosenthal's failsafe N indicates 10,326 unpublished or unretrieved studies would be needed to render these effects non-significant (i.e. $p > .05$; Field and Gillett 2010). The funnel plot supported this analysis, being approximately symmetrical indicating no significant publication bias. However, Begg and Mazumdar's (1994) rank correlation test was significant, indicating a possible publication bias ($\tau (N = 49) = 0.24$, $p = .02$).

Moderator Analysis

Potential moderating variables were examined using the Field and Gillett (2010) syntax and further sub group meta- analysis. The results of each analyses are shown in Tables 2.1 and 2.2 . Mean study participant age was a significant moderating variable of effect sizes ($b = -0.03$, $p = .05$). This negative linear relationship indicates as mean study participant age increases benefit of CCBT decreases. Type of control condition in RCTs significantly moderated effect sizes ($\chi^2 (1) = 19.30$, $p < .001$). Comparisons between CCBT and inactive control groups yielded higher effect sizes ($g = 1.11$, 95 % CI [0.89 – 1.33]) than comparisons between CCBT and active control groups ($g = 0.40$, 95 % CI [0.18 – 0.61]). No further significant moderating effect was found for any of the measured person, problem, program or provider variables. There was no significant moderating effect of support (guided vs. unguided interventions) on effect sizes; $\chi^2 (1) = 46$, $p = .50$. There was a trend for unguided programs to have higher effect sizes ($g = .95$, 95% CI [0.28 – 1.62]) than guided ones ($g = .95$, 95% CI [0.28 – 1.62]), however the large width of the confidence intervals for unguided programs and the overlap in confidence intervals suggests the estimate of effect for unguided programs is imprecise.

Table 2.1: Results of random effects model moderator analyses on continuous variables.

Moderator	<i>k</i>	<i>g</i> [95% CI]	β [95% CI]	<i>t</i>	<i>p</i>
<i>Year</i>	49	0.77 [0.59 – 0.96]	.05 [-0.11 – 0.14]	1.65	.11
<i>Risk</i>	49	0.77 [0.59 – 0.96]	.09 [-0.11 – 0.19]	1.79	.08
<i>Age</i>	48	0.78 [0.59 – 0.97]	- .03 [-0.59 – 0.00]	-1.99	.05
<i>Female (%)</i>	48	0.78 [0.59 – 0.97]	-.004 [-0.02 – 0.02]	-0.42	.68
<i>Education</i>	31	0.81 [0.63 – 0.99]	.004 [-0.01 – 0.01]	0.81	.43
<i>Medication</i>	35	0.79 [0.58 – 1.01]	.004 [-0.01 – 0.02]	0.75	.46
<i>Treatment History</i>	26	0.92 [0.66 – 1.16]	-.01 [-0.03 – 0.00]	-1.80	.09
<i>Attrition</i>	48	0.78 [0.59 – 0.97]	-.003 [-0.00 – 0.00]	-1.35	.18
<i>Support Time</i>	44	0.78 [0.59 – 0.97]	.001[- 0.004 – 0.001]	-1.17	.25

Table 2.2: Results of random effects model moderator analyses of categorical variables.

Moderator	g [95% CL]	χ^2 Test					
<i>Subgroup</i>			z	k	τ^2	Q	I^2
CMHD	0.77 (0.59 – 0.96)	1.69 (1), $p = .19$		49			
<i>Depression</i>	0.60 (0.29 – 0.91)		3.83***	14	0.30	122.69 (13) ***	89%
<i>Anxiety Disorder</i>	0.85 (0.63 – 1.07)		7.56***	35	0.35	213.52 (33) ***	85%
Access	0.77 (0.59 – 0.96)	1.53 (1), $p = .22$		49			
<i>Open</i>	0.80 (0.61 – 0.99)		8.25***	46	0.36	350.03 (45)***	87%
<i>Static</i>	0.37 (- 0.07 – 0.81)		1.66	3	0.10	6.78 (2)*	70%
Referral Source	0.77 (0.59 – 0.96)	.001 (1), $p = .98$		49			
<i>Self-referral</i>	0.76 (0.58 – 0.93)		8.55***	43	0.27	257.85 (42)***	84%
<i>Professional Referral</i>	0.89 (0.06 – 1.72)		2.10*	6	1.01	100.40 (5)***	95%
Support	0.77 (0.59 – 0.96)	.461 (1), $p = .50$		49			
<i>PSH & MCT (Guided)</i>	0.67 (0.52 – 0.83)		8.40***	42	0.21	193.75 (41)***	79%
<i>SA therapy (Unguided)</i>	0.95 (0.28 – 1.62)		2.77**	6	0.65	82.52 (5)***	94%
Support Medium	0.75 (0.56 – 0.94)	2.06 (1), $p = .36$		43			
<i>Remote</i>	0.79 (0.59 – 0.99)		7.66***	39	0.34	266.92 (38)***	86%
<i>In person</i>	0.39 (0.06 – 0.73)		2.30*	4	0.06	6.82 (3)*	56%
Control	0.76 (0.62 – 0.94)	19.30 (1), $p < .001$		48			
<i>Active</i>	0.40 (0.18 – 0.61)		3.66***	23	0.22	142.25 (22)***	85%
<i>Inactive</i>	1.11 (0.89 – 1.53)		9.75***	26	0.26	112.60 (25) **	78%

Note: MCT = minimal contact therapy, PSH = predominantly self-help, SA = self-administered therapy. 95% CL = 95% confidence interval, k = number of studies, τ^2 = tau, Q = Q statistic (homogeneity test), I^2 = I^2 statistic (homogeneity expressed as a percentage), z = test for overall effect. * $p < .05$, ** $p < .01$, *** $p < .001$.

Study Quality

Risk of bias was moderate. The mean risk of bias for the sample of studies was 12 ($M = 11.94$, $S.D = 1.94$) out of a possible 21. A moderator analysis was conducted to determine whether methodological quality of the study was a moderating variable. Risk of bias in a study did not significantly moderate study effect size ($\beta = .08$, $p = .08$).

2.4. Discussion

This systematic review and meta-analysis aimed to evaluate the effectiveness of CCBT as a low intensity psychological intervention for the treatment of common mental health disorders and determine whether any measured person, problem, program or provider characteristics significantly moderated this effect. A systematic review identified 49 studies that compared CCBT to a control condition in a study population with CMHD. A meta-analysis conducted on these 49 studies yielded an overall effect size of $g = 0.77$, 95% CI [0.59 – 0.95], in favour of CCBT interventions. The overall effect size is medium according to Cohen's criteria and is comparable to the average effect size of face to face CBT interventions for common mental health disorders ($d = 0.68$, Haby, Donnelley, Corry, & Vos, 2006). This finding corroborates the findings of previous meta-analysis which typically find medium to large effect sizes in favour of the effectiveness of CCBT in comparison to control conditions (Andersson & Cuijpers, 2009; Barak, Hen, Boniel – Nissim & Shapira, 2008; Spek, et al., 2007), and equivalence between guided self-help interventions and face-to-face comparators (Cuijpers et al., 2010). As such it is concluded that CCBT is an effective low intensity psychological intervention for the management of CMHD.

Of those beginning a CCBT intervention, on average, 28% dropped out before completion, no difference between drop out from the CCBT and control arms was found. This attrition rate is comparable to that reported in previous meta - analysis of studies of

CCBT (31.75%, Kaltenthaler, Sutcliffe et al., 2008), and within the range reported for studies of face to face CBT (5% - 38%, Watkins & Williams, 1998).

Significant heterogeneity was identified between studies, and moderator analysis was applied to provide an insight on the factors influencing the magnitude of CCBT effects. Methodological quality (risk of bias) varied between studies but did not significantly moderate effect sizes in this analysis. The mean age of study participants was found to be negatively related to the effectiveness of CCBT. In studies with participants of an older mean age, poorer intervention effects were identified. One interpretation of this finding might be that older adults may benefit less from CCBT interventions, however, none of these studies specifically evaluated CCBT in older adult populations – indeed all of the studies reported on working age adult samples, and in 90% of studies participant mean age fell between 30 and 45. It is possible that a subtle generational shift in favour of use of technologies within this population has resulted in greater benefits for CCBT within younger working age adult groups. Barak et al. (2008) reported similar effect in their meta-analysis, where young adults (as they defined 19 – 39 years old) yielded higher effect sizes for internet therapy for clients under 18 or older (> 40) adults.

Also, significantly larger benefits were found for CCBT in comparisons with inactive control conditions ($g = 1.11$, 95% CI [0.89 – 1.33]) than active control conditions ($g = 0.40$, 95% CI [0.18 – 0.61]). This finding conforms to that of the majority of similar meta-analysis, in which comparisons with inactive control conditions yielded higher effect sizes than other types of control group comparison (Andersson & Cuijpers, 2009; Gellatly et al., 2007). This suggests that some of the benefits of CCBT may be accounted for by ‘common factors’ shared between the CCBT interventions and active control conditions, but also offer added-value in comparison to

these conditions. These findings suggest that CCBT can offer an effective intervention option in contexts where other treatment options are not available or are not accessible, but may also offer non-negligible benefits in comparison to other active treatments. This suggests that the use of CCBT should also be considered in contexts where some active interventions are already available.

No further measured study variables (gender, percentage of participants completing university education, percentage of participants taking psychotropic medication, the percentage of participants with no previous treatment history for the CMHD, type of problem, referral source, program characteristics, therapeutic support time) had significant moderating influences on effect sizes. This suggests that the effectiveness of CCBT is similar across a broad range of circumstances. The present analysis found no significant difference in effect sizes between guided and unguided programs. Sub group analysis did however show a trend for unguided programs to have higher effect sizes ($g = .95$, 95% CI [0.28 – 1.62]) than guided ones ($g = .67$, 95% CI [0.52 – 0.83]). . This is contradictory to previous reviews that have typically suggested that supported programs are more effective than unguided, self-administered programs (Andersson & Cuijpers, 2009; Gellately et al., 2007; Spek et al., 2007). The non-significant difference between unguided and guided programs may be due to a lack of statistical power as only six studies using unguided programs were identified for inclusion in the analysis. Furthermore, the width of the confidence intervals for unguided programs is wide, indicating this estimate of effect size for unguided programs is imprecise. This effect size may be smaller than that of guided interventions as the confidence intervals also overlap. It is not therefore possible to be confident in this finding and further research is needed to provide further evidence.

Limitations

There are several limitations of the present study. The present meta-analysis investigates only short-term benefits of CCBT based on post intervention outcome measures. This is because many studies did not use follow up measures, particularly those RCTs using waiting list control groups. It is possible that moderators of immediate therapeutic benefits differ to those moderating longer-term outcomes (Gellatly et al., 2007). The methodological quality of the studies included was adequate but risk of bias was moderate. Much of the risk of bias could be attributed to performance and “other” bias. All studies suffered from a high risk of performance bias. Due to the nature of the intervention participants are rarely blind to the treatment allocation. A risk of “other” bias, (sources of bias not attributable to one of the other seven domains of the Risk Assessment Tool) was also particularly high. In this analysis, other potential bias was related to RCT design, specifically studies which compared a CCBT intervention to another kind of active intervention, without a waiting list control group trial arm. Attrition bias was generally low to unclear. To improve the power of analyses, active intervention conditions were grouped together in this analysis, comparison between CCBT and specific alternatives including both psychological and pharmacological interventions would be valuable. To improve the power of analyses, anxiety disorders were grouped together in this analysis. Not all anxiety disorders were adequately represented across studies (for example only one study targeted OCD). The findings of the present analysis are also limited in that they cannot be generalised beyond the populations and programs studied.

Implications

The overall findings from this meta-analysis indicate that CCBT may be an effective low intensity psychological intervention for common mental health disorders including anxiety and depression. Although CCBT appears effective, it is not a panacea for all presentations of common mental health disorders. As the evidence base for CCBT effectiveness develops, further analysis of moderators of engagement and outcomes should be explored. Answering these questions may mean the difference between getting dissemination right and making a positive impact on public health or getting it wrong, facing public rejection of CCBT and hindering the public health impact of this effective intervention. The issue of how much therapeutic support is needed for CCBT, and how it should be offered remains a confliction. Future studies should compare varying levels of clinician contact to help determine what, if any added benefit this brings. Of the few published studies exploring this question, frequency and type of support appears to make little difference in outcomes. For example, Klein et al. (2009) examined whether differing levels of therapist contact influenced treatment outcomes on an online CBT program for panic disorder. No significant differences were found on outcomes between groups offered three email contacts or one email contact per week. Furthermore an RCT comparing two types of support (web forum or telephone calls) demonstrated no significant difference between group outcomes for an online CBT for social phobia (Titov et al., 2009).

Conclusions

This meta-analysis assessed the effectiveness of computerised cognitive behavioural therapy for the treatment of common mental health disorders and yielded a significant effect size in favour of CCBT over both active and inactive control groups. Mean participant age and type of control group significantly moderated effect sizes. Support (SA programs versus PSH/MCT programs) did not moderate effect sizes. It is concluded that CCBT can be an effective low intensity intervention for CMHD, and efforts should continue in research and practice to increase the availability of these evidence based interventions to those who may benefit.

Chapter 3

A systematic review of the factors influencing engagement with computerised cognitive behavioural therapy for common mental health disorders

3.1. Introduction

Defining engagement in CCBT

In order to investigate the factors associated with CCBT engagement a working definition of engagement needs to be established. There is no agreed definition of what constitutes “engagement” with face to face CBT therapy or with CCBT (Bados, Balaguer, & Saldaña, 2007; Cavanagh & Millings, 2013b). From a medical perspective, following a course of treatment as advised by a health practitioner is often termed adherence (or compliance). Adherence is defined as the extent to which a person’s behaviour coincides with medical or health advice (Haynes, Taylor & Sackett, 1979). Adherence is usually to an advised drug regime, to the use of medical appliances, aftercare and attendance to psychotherapies. Note, medical literature does not state a patient ‘engages’ with a medical regime; rather, they adhere to it or they do not. This holds passive connotations about the patient’s role in their treatment outcomes. Active engagement with the therapeutic content of CCBT is essential however for positive therapeutic outcomes as the individual is positioned as the mechanism of change. Literature from the field of psychotherapy posits that active client participation is crucial. Ideally, clients are required to accept the therapy model on emotional and cognitive levels, and execute agreed behaviour within and outside of sessions (Nelson & Borkovec, 1989). Client participation in treatment is dynamic and derives from decisions clients make based on their goals, beliefs and experiences in treatment. In turn

these are influenced by clinicians, significant others, treatment settings and greater social and cultural forces.

Whilst sharing some features with traditional therapies, in CCBT the individual interacts with the therapeutic content of CBT via a computer interface; A human – computer interaction (HCI). Therefore to understand engagement with CCBT it is imperative to also explore engagement in terms of HCI. Unlike the arenas of psychotherapy and CCBT, HCI has given a greater effort to comprehend what engagement means because it is deemed as highly important for the design and implementation of interfaces (Peters, Castellano & de Freitas, 2009). O’Brien and Toms (2008; 2010) propose a process – based model of engagement with technology which may be applied to a model of engagement with CCBT. O’Brien and Toms state engagement consists of four distinct stages and attributes that define each stage. Furthermore, engagement requires attentional and emotional involvement from the user. These stages consist of; *the point of engagement, sustained engagement, disengagement* and *re-engagement*. A definition of each stage and the attributes that define them are reported in Table 3.1.

Various metrics have been utilised to measure client engagement. These include measures of attrition and programme completion, acceptance or rejection of services and treatments and attendance measures. These measures appear to tap into behavioural aspects of engagement. Other measures have considered engagement in terms of client cooperation (or resistance), affective responses and self – exploration (Littell, Alexander, & Reynolds, 2001). These measures explore the level of investment a client has given to their own therapy. ‘Investment measures’ explore a deeper, more complex level of participation than behavioural measures. To fully understand engagement with CCBT (and psychotherapy in general) it would appear necessary that both behavioural and

investment measures be investigated. Drawing from the fields of medicine, psychology and HCI, an operational definition of engagement with CCBT can be conceptualised as the following;

The process in which a person begins and continues to actively adhere to a course of CCBT with attention, emotional involvement and required behaviours of the CBT model until which time they completely cease interacting with the programme and do not re – engage.

Table 3.1: Stages of the Process Based Model of Engagement and Attributes Defining Each Stage.

	Definition	Attributes
Point of engagement	Beginning point of engaging experiences	Driving users to engage, attraction to the aesthetics of the interface, novelty, interest, motivation, and having a goal
Sustained engagement	The time the individual is attending to the interface.	Attention given to the task, the level of interest, novelty of the experience and individual perceptions of effort needed to use the application (challenge), feedback, user control, interactivity, and aesthetic appeal.
Disengagement	Ceasing to be engaged with the system or stop using the system entirely.	Negative emotions such as boredom, frustration with the technology, uncertainty, information overload. Also positive emotions such as feelings of success and accomplishment on task completion.
Re-engagement	when individuals disengage but return to the application at a later time	Incentives for re – engagement include wanting to have fun, learning something new and being rewarded. Also includes a feeling of hope, new understanding and change in circumstances.

A process – based model of CCBT engagement

This is a process – based model which aims to include aspects of behavioural and investment measures. Furthermore it envisages engagement with CCBT as being contingent on cognitive, emotional and behavioural tendencies within the individual (see Figure 3.1). In CCBT, the therapeutic journey of the individual begins at the point of engagement. Cognitive aspects of uptake include a decision to begin therapy, behavioural aspects include logging onto the program and emotional/relational aspects involve an acceptance of beginning therapy and the therapeutic model. During the period of sustained engagement the attention of the individual (a cognitive aspect) is focused on the program interface and the programme content. Behavioural aspects of sustained engagement include active participation during sessions and adherence to homework assignments.

Emotional/relational aspects of sustained engagement may involve active learning from the program and affective responses. Disengagement from the program may be due to program completion or a relief in symptoms. In this case cognitive aspects may include a decision that one no longer requires therapy. Emotional/relational aspects of this include the acceptance that the program has ended or is no longer needed. Another possible motivator for disengagement stems from a cognitive decision to cease the program. This will be related to negative affective factors such as a dislike of the program, a feeling it is not helpful or a host of other negative emotions. In both forms the definitive behavioural aspect is that of no longer logging onto or participating with the program.

Although the process – based model of engagement with CCBT is contingent on cognitive, emotional and behavioural aspects within the individual, these emotional and

behavioural aspects are in turn contingent on factors both internal and external to the individual. For example, qualitative studies focusing on patient experiences using CCBT have identified several barriers to engagement: Poor computer skills and a fear of technology (a participant related factor), a negative experience of the course content (a factor attributable to the program), a lack of motivation to use CCBT due to the nature of depression (a factor attributable to the CMHD) and a lack of human input (a factor attributable to the providers of CCBT; Elsegood & Powell, 2008, Gerhards et al., 2010, Hind et al., 2010).

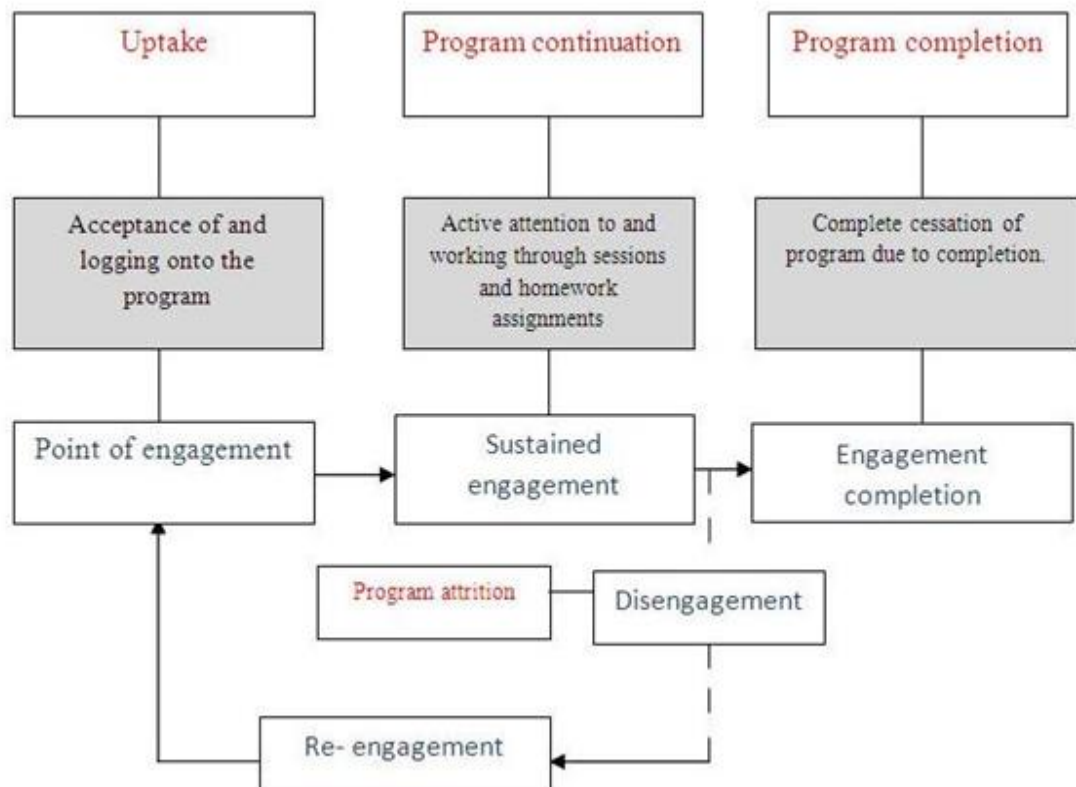


Figure 3.1. A process – based model of engagement with associated engagement metrics by stage (top boxes) and the cognitive and behavioural characteristics of each stage (middle boxes).

To make sense of these complex factors which are associated with engagement and disengagement, Cavanagh and Millings (2013b) present a quadripartite model describing the core factors associated with engagement and attrition from CCBT. These include: (1) Program factors, (2) Problem factors (3) Person factors and (4) Provider factors.

Program factors

One potential program related variable which may influence engagement is the modality of the program. CCBT programs are typically delivered via the internet or by stand – alone PC package. Does one modality promote better engagement than the other? Unsupported internet programs for depression tend to have a higher drop out (Andersson, 2009). It is plausible that because internet based programs are highly accessible, initial engagement may be high, but attrition may also be high as internet programs can be quickly dismissed. However, the difference in engagement between computer based and internet delivered CBT has yet to be evidenced. Little is understood about how the length of CCBT programs (and the sessions themselves), program interactivity, structure, content and the incorporation of therapeutic common factors may influence engagement with CCBT (Cavanagh & Millings, 2013b).

Problem factors

The symptoms of the CMHD itself may also influence engagement. Lack of motivation due to depressive symptoms has been reported by patients as a reason for dropping out of CCBT research trials (Klein, Richards & Austin, 2006; Richards, Klein & Austin, 2006). It appears that symptoms of depression such as low energy, helplessness and poor concentration impede on engagement with CCBT. There is sparse research into the differences in engagement between programs targeting depression and those for anxiety disorders; as such the any difference between programs for different

CMHDs needs exploration. Problem severity, complexity and comorbidity with other conditions may also be associated with program engagement.

Person factors

Identifying the type of patient who is likely to benefit from CCBT is an issue for research, with particular consideration being given to age, gender, medication and previous treatment (Kaltenthaler et al., 2006). Socio – economic variables such as education have also been considered influential in CCBT engagement. A literature review of the factors influencing early termination from traditional CBT interventions showed a lower education level was associated with early treatment cessation (Salmoiraghi & Sambhi, 2010). CCBT research trials that have examined education as a factor influencing attrition, have found completer and non – completer groups do not differ in terms of education level (Spek et al., 2007) and one study found attrition increased as the number of years in education decreased (Spek et al., 2008). Patient treatment history and medication use may also affect engagement with CCBT. It is plausible to assume that experience with previous psychological treatments would influence the approach patients may take to CCBT and consequently their engagement with it. Evidence from traditional therapy suggests individuals receiving medication and therapy are less likely to drop out than individuals receiving single modality treatment (Edlund et al., 2002). Although some studies in the CCBT field do report medication use as part of participant demographic information, this measure had not yet been explored in relation to engagement. An understanding of who is most likely to benefit and engage with CCBT is important because if CCBT is delivered to unsuitable patients they may experience treatment failure and therefore mistakenly presume that CBT does not work for them (Andersson, 2010). Cavanagh & Millings (2013b) also note that user expectations and individual differences in personality and attachment styles may

influence engagement with CCBT as they have been evidenced to influence engagement with face to face therapies (Eames & Roth, 2000).

Provider factors

Referral. There is scarce research into the influence of referral source on engagement with CCBT. Some evidence from traditional therapies suggests clients referred into therapy by health professionals experience high levels of pressure to change, lower levels of engagement and higher rates of attrition compared to self-referred clients (Begun et al., 2003). Only one primary research trial has investigated the effect of referral source on outcomes in CCBT. Mataix – Cols, Cameron, Gega, Kenwright & Marks (2006) report a study in which 355 participants were classified as either being referred from GP's, mental health professionals or self-referred. GP referrals improved the most on clinical outcome measures followed by self-referrals and mental health professional referrals. This study found no significant difference between referral groups on uptake, and no significant difference in completion between groups. However, the authors note the limited statistical power of the study, therefore the effect of referral source on engagement with CCBT requires further exploration.

The role of support. One contentious question in the field of CCBT is the role of human therapeutic support. The majority of evidence from research trials and reviews indicate guided programs are more effective and engaging than unguided programs. Results of a meta-analysis of internet based CBT for depression and anxiety indicate guided programs are more effective and have less attrition than unguided programs (Spek et al., 2007). A recent review of programs for depression and anxiety found lower adherence to unguided programs and programs with little therapist contact (Newman et al., 2011). This review also found guided programs to be effective for a wider range of disorders than unguided programs, suggesting structured therapist input is important in

treatment success (Newman et al., 2011). Although the majority of research suggests guided programs produce better engagement than unguided programs, this is not always the case. A recent RCT comparing unguided, guided and step up support on demand programs for social phobia revealed no significant difference between groups on primary outcome measures, attrition, or adherence measures (Berger et al., 2011). There are still questions which remain to be answered regarding the role of support in CCBT.

Support providers and structure of support. As a low intensity intervention, CCBT is intended to be provided by a variety of practitioners to save specialist therapist time (Bennett – Levy et al., 2010). In support of this, evidence suggests that CCBT delivered by a minimally trained ‘technician’ is equivalent to clinician assisted programs in terms of outcomes and attrition (Robinson et al., 2010; Titov et al., 2010). Although this evidence is encouraging, further support is needed to explore whether this trend extends across all CMHDs and not just depression (Titov et al., 2010) and GAD (Robinson et al., 2010). Furthermore, the structure of any support provided may be individually tailored to each user or be standardised for all users, with room for flexibility based on their presenting problems. Sparse research has investigated whether the nature of support makes any difference to engagement with CCBT. One RCT of internet based CCBT for social phobia demonstrated no significant differences between the three trial groups; one unguided group with no support provided, one group provided with weekly email support, and one group which were able to choose their level of support and could access a therapist via phone (Berger et al., 2011). Again, evidence needs to demonstrate whether this finding is replicated across all CMHDs.

Measuring engagement with CCBT

In a review of the barriers to the uptake of CCBT, Waller and Gilbody (2009) explore several engagement metrics mostly derived from Consolidated Standards of Reporting Trials (CONSORT) diagrams depicting participant flow throughout a research trial. These metrics include the ratio of how many people who initially show participation interest who then began a research trial (uptake), the number and percent of participants who completed the trial CCBT program (program completion), the ratio of participants who do not complete the CCBT program in the allocated time frame (attrition), and the ratio of participants who completed the research trial including follow up (study completion). Evaluating program completion and program attrition allows an insight into program adherence, how acceptable a program is and how well it may be utilised outside of a research trial. Study completion provides an evaluation of how participants adhere to research protocols. This paradigm for measuring engagement with CCBT permits a science of participation and not simply the science of attrition.

Previous evidence

Kaltenthaler, Sutcliffe et al., (2008) explored various indicators of acceptability including uptake rates, attrition, treatment satisfaction rates and identified 16 studies for inclusion in their review. Limited information was available on uptake rates, however where reported, figures ranged between 3.3% and 25%. The authors note this is low but may signify a reluctance to enter a research trial rather than CCBT itself. Attrition rates ranged from 0% to 75% with an average of 31.75% which is comparable to that of face to face CBT (Watkins & Williams, 1998). Reasons for attrition were reported in only six studies, the most common reasons being participants were too busy or had a change of circumstances. Treatment satisfaction was reported to be generally good with positive

expectancies and high satisfaction with CCBT. Kaltenthaler, Sutcliffe et al., (2008) conclude there is a limited evidence base and further research is needed.

Waller and Gilbody (2009) investigated the barriers to CCBT uptake with a focus on acceptability, accessibility and concerns about using CCBT. Quantitative data on acceptability indicated that compared to the number of people invited to take part, very few actually began a study (38% on average) but a fair proportion finished a study (79% on average). This indicates uptake and completion are low. However, Waller and Gilbody make the important distinction between attrition from a research trial and attrition from treatment. They report only a 58% treatment completion rate in the studies they reviewed. As with the Kaltenthaler, Sutcliffe et al., (2008) review many studies did not report reasons for attrition, but the main reasons reported were personal circumstances and lack of time. Again, Waller & Gilbody (2009) report there is limited evidence and further research is required.

Aims of the current review

The present review aims to systematically explore the factors influencing engagement with CCBT programs for CMHDs. By systematically searching for relevant studies and extracting information on influential variables and engagement metrics, analyses will be conducted to determine whether any relationships between these variables exist. The factors influencing engagement and disengagement with CCBT must be better understood if CCBT is to be successfully implemented and make a positive impact on public health. In the arena of CCBT the most prominent engagement metric to be discussed and reported is participant attrition. Eysenbach (2005) describes the phenomenon of participants stopping CCBT usage and/or being lost to follow up (“The Law of Attrition”) as one of the fundamental characteristics and challenges of eHealth applications. As opposed to the complex human interactions of traditional

therapy, interventions delivered via computerised media can be rejected by a single click. Systematic reviews place attrition rates between 31.75% (Kaltenthaler, Sutcliffe et al. 2008) and 44% (Waller & Gilbody, 2009). These systematic reviews, while providing an overview of engagement with CCBT programs in research trials at the time of publication, do not offer a contemporary depiction of CCBT engagement or an analysis of the factors influencing engagement. Despite the acknowledgement that attrition is a widespread issue for both psychological and pharmacological interventions, it is a phenomenon which warrants further attention in the field of CCBT. Not only would a picture of intervention attrition parallel the concept of tolerability of conventional treatments (Christensen & Mackinnon, 2006) but would provide a transparent picture of their diffusion outside of RCT settings. Furthermore this systematic review aims to analyse how components of the Four P's model (Cavanagh & Millings, 2013b) may be associated (at a group level) with the uptake and treatment completion portions of the process based model of engagement with CCBT, as depicted in Figure 3.2:

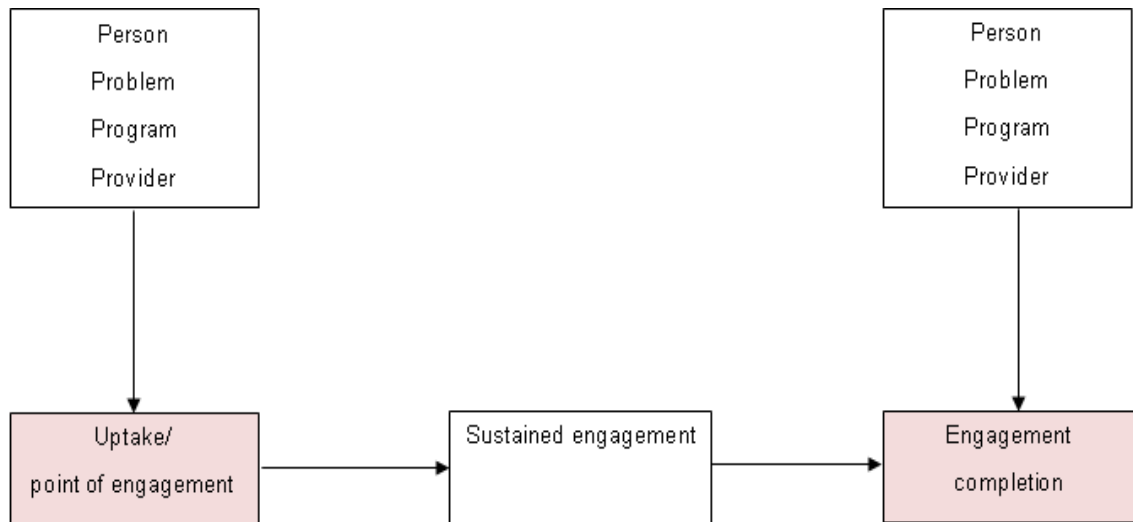


Figure 3.2. Illustration of the process based model of engagement and how this review will analyse how the factors of the Four P's model (Cavanagh & Millings, 2013b) may influence uptake and treatment completion.

3.2. Method

Literature Search

This review was conducted according to NHS best practice guidelines (NHS Centre for Reviews and Dissemination, 2001). Primary research trials to be included in this analysis derived from a systematic literature search of 9 electronic databases: ASSIA, MEDLINE, NHS Centre for Reviews and Dissemination, PsychArticles, PsychInfo, Science Direct, Scopus, the Cochrane Library and Web of Knowledge. The search covered years 1966 to May 2012 in the fields of computer science, medicine, nursing and health professions, psychology and social sciences. Reference lists of articles were searched for relevant studies. Search terms consisted of variations (both grammatical and abbreviations) on the words computerised cognitive behavioural therapy (CBT), CCBT, internet-based CBT, internet delivered CBT, internet based CBT,

ICBT and web-based CBT. The second search incorporated population terms including; depression (including sub-threshold disorders), anxiety, phobias, social anxiety disorder, GAD, panic disorder, OCD and PTSD. The final phase of the literature search integrated indicators of engagement metrics: acceptability, engagement, dropout, adherence, attrition, barriers and uptake.

Inclusion Criteria

- (1) Any study which presented group level quantitative data for users of a CCBT program for CMHDs was deemed acceptable for inclusion in the review; hence no restrictions were imposed on the research design.
- (2) The study must report at least one of the engagement metrics defined below and at least one risk factor (see ‘data coding’) or this information should be calculable from the reported information.
- (3) A study population of adults (> 16 years)
- (4) A study population experiencing symptoms of CMHDs (as defined by NICE, 2011a); Studies needed to have inclusion criteria which either required screening by the researcher to ensure participants to fulfilled DSM – IV – TR criteria for the target CMHD using an appropriate interview schedule or required participants to be identified by a health professional as suffering from a CMHD, assessed using an appropriate interview schedule
- (5) The study intervention must be based on the principles of CBT and be accessed via any computerised media.

Exclusion Criteria

- (1) Studies were excluded if they involved book – based self-help only, self – help delivered purely by email or telephone based contact with a therapist, virtual reality applications, or ‘live’ CBT therapy delivered over the internet.
- (2) Studies with populations for whom psychotic and related disorders, eating disorders, drug and alcohol misuse were the primary focus of the intervention were also excluded
- (3) Study populations of children under the age of 16.
- (4) Studies in which no information on engagement metrics or risk factors were reported, or was not calculable for the treatment arm were also excluded.
- (5) Studies which were meta-analysis, systematic reviews or replicated another study were excluded.
- (6) Results were excluded if they duplicated a study already identified and included or presented the same data as a study already included (but published in a different journal).

No restrictions were imposed on the severity of disorders, chronicity, or co-morbidity with other CMHDs. Figure 3.3 illustrates review process and the number of papers excluded at each stage

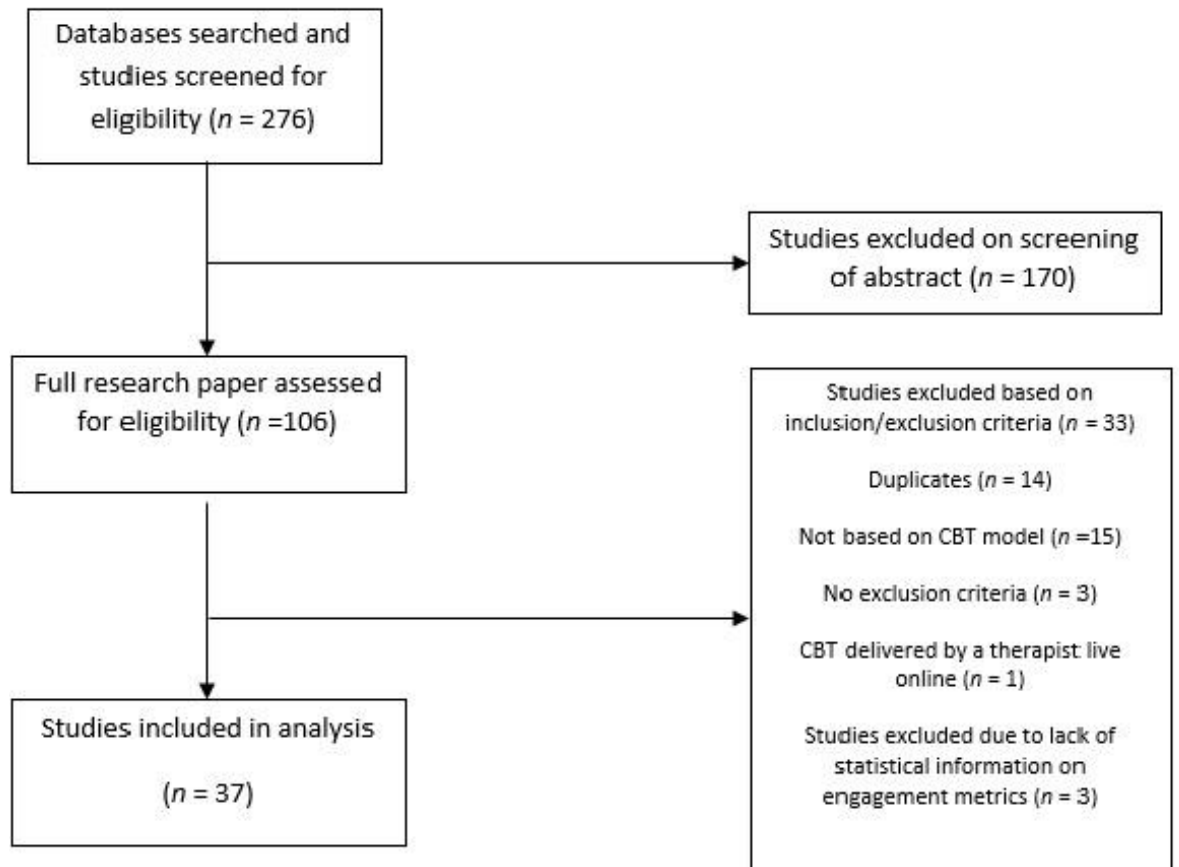


Figure 3.3. Diagram illustrating the flow of studies throughout the literature search process.

Data Coding

Variables which may influence engagement metrics were extracted from each study.

These variables included the following:

1. **Person;** Measures of participant demographics, (for RCT designs this included the intervention condition only) extracted included the mean age (in years) of participants, the percent of females in the study sample, the percent of participants completing university education, the percent of participants taking psychoactive medication to treat the CMHD and the percent of participants with no psychological treatment history.

2. **Problem;** Information concerning the CMHD included whether the treatment focus was on depression or anxiety disorder.
3. **Program;** whether the program was delivered by a standalone PC package or via the internet.
4. **Provider;** included who referred participants into the study (self-referral or referral by a health professional). Provider details also included whether the program was guided or unguided, the mean therapeutic support time spent by therapists for the duration of the intervention (per patient in minutes), the medium of the therapeutic support (remote support or in person), the structure of the therapeutic support (standardised or individualised) and the occupational role of the support provider (therapist or paraprofessional)

Study information extracted included the design of the study (RCT or open trial), the year of publication and the quality of reporting engagement metrics (see study quality assessment) in the publication.

Engagement metrics were intended to capture the uptake and completion aspects of the process based model of CCBT engagement. Unfortunately this review could not capture metrics of sustained engagement because they have not been measured consistently by primary research trials.

(1) **Uptake percent;** the percentage of people initially showing interest in participation who began a research trial.

(2) **Program completion;** All interventions included in the analysis were structured and had a set number of modules to complete; therefore program completion was defined as the number and percentage of people who completed all modules of the

treatment program in the allocated study time. Some studies reported this information directly in as the number or percentage of participants completing a program. Others reported this information in terms of program attrition - the number and percent of participants who began a CCBT program but dropped out before completion of all program modules within the study time frame. As conceptually and statistically, attrition is defined as the inverse of treatment completion, only treatment completion was analysed further (correlation between attrition and treatment completion was $r = 1.00$, $p < .001$, $N = 37$). For studies which did not report this or could not be inferred from the available information, those providing post intervention data are assumed to have completed the whole program.

Study Quality Assessment:

To determine the suitability of studies, papers were graded according to their appropriateness in assessing engagement with the CCBT intervention. Studies were coded on whether or not they reported the following: A CONSORT flow diagram depicting the flow of participants throughout the trial, the number of people who expressed interest in taking part or were referred by a health professional and the number of people who began a trial (uptake), the number and/or percent of participants who began the CCBT program but did not complete all modules in the study time frame (attrition), the number and/or percentage of people who completed all modules of the treatment program in the allocated study time (program completion), the number and/or percent of participants who completed all questionnaires to follow up (study completion), participant reported reasons for attrition (as opposed to author speculation) and participant feedback/satisfaction with the program. A coding of 1 was given if the information was reported, a coding of 0 was given if it was not. Each study was

therefore given a final score out of 7, the higher the mark indicating better reporting of engagement.

Analysis

A systematic review method was deemed appropriate in order to identify and synthesize the available relevant studies. The extracted data was then subject to aggregate level data analysis in order to determine whether any relationships existed between the 'Four P's' variables and engagement metrics. A meta – analysis was not performed on this review as the effectiveness of CCBT has already been addressed in the previous chapter and the focus of this chapter is on determining the existence of relationships between predictor (Four P's) and outcome (engagement metrics) variables.

To investigate the relationship between engagement metrics and participant, problem, program and provider variables a series of analysis were conducted on the data for within groups effects for participants who accessed CCBT. The data was initially screened to ensure the assumptions of parametric data were met in accordance with Field (2013). To obtain a view of CCBT uptake and completion across studies, descriptive statistics were calculated. A series of analyses were then conducted for each engagement metric. Correlation analyses were conducted to ascertain whether participant characteristics were associated with program uptake and completion. The level of significance was adjusted using a Bonferroni correction in order to reduce the familywise error rate associated with conducting multiple analysis on the same data (Field, 2013). Independent samples t – tests were undertaken to determine whether program uptake and program completion differed according to type of CMHD and according to type of program media. Two way (referral; self or other x level of support; guided, unguided) independent ANOVAs were performed, one with uptake as the dependent variable and one with treatment completion as the dependent variable. A

correlation analysis was conducted to determine whether support time was related to CCBT completion. To further explore how differing kinds of support may influence engagement, a three way (support medium; remote or in person, support structure; individualised or standardised and support provider; therapist or other professional) ANOVA was conducted with CCBT completion as the dependent variable.

3.3. Results

Descriptive statistics

A total of 37 studies were included in the final analysis. This represents a sample of 4,347 participants in total ($M = 117.49$, $S.D = 130.91$), of whom 2,476 ($M = 66.92$, $S.D = 95.43$) were in CCBT treatment groups. The following data refers to these CCBT participants. Appendix C includes a table illustrating the main study characteristics for each included trial. The mean age of participants included in all 37 studies was 39 years ($M = 39.44$, $S.D = 5.45$). On average, trials constituted 69.80% of female participants, 44.97% of participants who had completed university education, 39.00% of participants who were taking psychotropic medication for the CMHD of focus during the research cycle, and on average 48.92% of participants in a research trial had no previous psychological treatment history. The majority of CCBT programs included in the analysis targeted anxiety disorders ($N = 19$, 51.40%). Eighteen research trials assessed CCBT programs targeting depression (48.60%). The majority of programs were delivered over the internet ($N = 27$, 73%) allowing access anywhere with an internet connection. Ten programs were delivered via a PC package (27%) in which access was restricted to a static location.

Source of referral into research trials was either by self-referral ($N = 27$, 73%) or by a health professional ($N = 10$, 27%). Most of the CCBT programs were guided, offering varying levels of additional support to participants ($N = 31$, 83.8%). Six programs were unguided (16.20%). Of the guided programs a mean additional support time of 125 minutes was spent per participant for the duration of the intervention ($M = 125.48$, $S.D = 116.48$). This time refers to additional therapeutic support only and does not include pre - intervention assessment or follow up. Support was typically provided to participants remotely, via email or phone ($N = 21$, 56.80%). Support was also provided in person during 10 of the studies (27%), six studies did not report this information (16.20%). Typically, support was individualised to each participant ($N = 18$, 48.60%), seven studies utilised standardised responses in supportive communications (18.90%), six studies did not report this information and six studies were unguided (32.40%). Providers of support included therapists, as defined in each study ($N = 16$, 43.20%) and other health professionals, such as nurses and psychologists ($N = 13$, 35.10%). Two studies did not report the occupation of those providing support and six studies were unguided (21.60%).

Study quality

Randomised controlled trials constituted the majority of studies in this analysis ($N = 25$, 67.60%) and the remaining 12 (32.40%) were open trials. Studies typically achieved an average of 5 (out of a possible 7) for the quality of reporting engagement metrics ($M = 5.57$, $S.D = 1.01$).

Main Analysis

Uptake. For the sample of included studies the number of people showing initial interest or targeted for inclusion totalled 37,170 and ranged from 30 to 23,139 ($M = 1,126$, $S.D = 40,88.15$). The total number of people participating in included studies (all

conditions) was 4,347 and ranged from 14 to 555 participants per study ($M = 117.49$, $S.D = 130.91$). Therefore the uptake percentage for the whole sample was 11.69% ($M = 45.61\%$, $S.D = 27.75$, range = 1.31% to 100%). Of the 4,347 people included in a research trial, a total of 2,476 ($M = 66.92$, $S.D = 95.43$, range = 11 to 555) were CCBT participants.

Participant factors and uptake. A correlation analysis was conducted in order to determine whether any participant factors (across all studies) were associated with program uptake. In order to control for the familywise error rate (Type I error) associated with making several comparisons, a Bonferroni correction was applied to the alpha level of significance¹⁴. Therefore the significance level was adjusted to $p < .008$. Bias corrected and accelerated bootstrap 95% confidence intervals are reported in the square brackets. Results showed a significant, positive correlation between use of psychotropic medication and CCBT uptake, $r = .97$ [0.79, 1.00], $p < .001$. None of the other participant factors were significantly correlated with uptake percentage; for the mean age of CCBT participants, $r = .57$, $p = .09$, for the percentage of females in the CCBT samples for each study $r = .48$, $p = .14$, for the percentage of participants completing university education $r = -.23$, $p = .32$, for the percentage of participants with no previous psychological treatment history $r = -.56$, $p = .10$. These correlations are reported in Table 3.2.

¹⁴ The Bonferroni correction is calculated by dividing α by the number of comparisons (κ ; Field, 2013).

Table 3.2: Correlations between person factors and CCBT uptake.

	<i>Uptake</i>	<i>Age</i>	<i>% females</i>	<i>% completing university</i>	<i>% taking psychotropic medication</i>	<i>% with no psychological treatment history</i>
Uptake	1					
Age	.57	1				
% females	.48	.80	1			
% completing university	-.23	.56	.28	1		
% taking psychotropic medications	.97* [0.79, 1.00]	.58	.43	-.23	1	
% with no psychological treatment history	-.56	-.32	.01	-.19	.04	1

Note: * $p < .001$, BCa bootstrap 95% CIs reported in the brackets.

Problem factors and uptake. An independent samples t – test was conducted to ascertain whether uptake into studies differed by programs targeting depression or anxiety disorders. On average, studies using programs treating depression had a higher uptake of 50% ($M = 50.40$, $S.D = 33.35$) compared to studies using programs treating anxiety disorders that had a mean uptake of 42% ($M = 40.08$, $S.D = 23.13$). This difference, 8.32, BCa 95% CI [-11.99, 29.63], was not statistically significant, $t(31) = 0.85$, $p = .40$, and represented a small sized effect, $d = 0.36$. As such, CCBT uptake did not differ according to the type of CMHD being targeted.

Program factors and uptake. An independent samples t – test was conducted to ascertain whether uptake into studies differed by programs delivered via the internet or by a stand – alone PC package. On average, studies using programs delivered using a static PC package had a higher uptake of 67% ($M = 67.18$, $S.D = 19.66$) compared to studies using programs delivered over the internet that had a mean uptake of 39% ($M = 39.80$, $S.D = 26.98$). This difference, 27.38, BCa 95% CI [8.99, 47.82], was statistically

significant, $t(31) = 2.50$, $p = .02$, and represented a large effect size, $d = 0.91$. This demonstrates that CCBT uptake was significantly higher in studies using static PC packages compared to studies using internet based programs.

Provider factors and uptake. A two way (referral; self or other x level of support; guided, unguided) independent ANOVA was conducted with uptake as the dependent variable. There was a non-significant main effect of referral type on program uptake, $F(1, 29) = 2.40$, $p = .13$, $\eta^2 = .08$. There was also a non – significant main effect of type of support of program uptake, $F(1, 29) = 0.39$, $p = .54$, $\eta^2 = .02$. These findings suggest CCBT uptake does not differ according to whether the patient self – refers or is referred into a study by a clinician. It also suggests uptake does not significantly differ according to whether the program provides support or not.

Treatment Completion. Of 2,476 individuals beginning CCBT, 777 ($M = 21$, $S.D = 31.03$, range = 1 to 161) did not complete the program. This translates to an attrition rate of 31.38 %. Of 2,476 CCBT participants, a total of 1,669 ($M = 46.10$, $S.D = 67.67$, range = 6 to 394) completed their assigned program. This equates to 67.41% completion for the whole sample based on data weighted for sample size. At study level, treatment completion percentage was 71.45% on average ($S.D = 14.92\%$, range = 36% to 98.80%).

Participant factors and treatment completion. A correlation analysis was conducted in order to determine whether any participant factors (across all studies) were associated with program uptake. Again, a Bonferroni correction was applied to the alpha level of significance and the significance level was adjusted to $p < .008$. Bias corrected and accelerated bootstrap 95% confidence intervals are reported in the square brackets. Results demonstrated a significant negative correlation between the mean age of study

participants and treatment completion, $r = -.44$ [-0.70, -0.11], $p = .006$. There was also a significant, positive correlation between concurrent use of psychotropic medication and CCBT program completion, $r = .86$ [0.51, 0.99], $p = .003$. There were non – significant correlations between program completion and the percentage of females in the study, $r = .11$, $p = .26$, percentage of participants completing university, $r = -.39$, $p = .17$ and the percentage of participants in studies with no previous history of psychological treatment $r = -.67$, $p = .04$. These results are reported in Table 3.3.

Table 3.3: Correlations between person factors and CCBT completion.

	<i>Treatment completion</i>	<i>Age</i>	<i>% females</i>	<i>% completing university</i>	<i>% taking psychotropic medication</i>	<i>% with no psychological treatment history</i>
Treatment completion	1					
Age	-.44* [-0.70, -0.11]	1				
% females	.11	.28	1			
% completing university	-.39	.32	.15	1		
% taking psychotropic medications	.86** [0.51, 0.99]	.59	.37	-.29	1	
% with no psychological treatment history	-.67	-.31	-.14	-.16	-.56	1

Note: * $p = .006$, ** $p = .003$. BCa bootstrap 95% CIs reported in the brackets.

Problem factors and treatment completion. An independent samples t – test was conducted to ascertain whether the mean treatment completion differed by programs targeting depression or anxiety disorders. On average, programs treating anxiety disorders had a higher treatment completion of 76% ($M = 76.60$, $S.D = 12.55$) compared to programs treating depression which had a mean treatment completion of

66% ($M = 66.02$, $S.D = 15.61$). This difference, -10.57 , BCa 95% CI $[-19.81, -2.35]$, was statistically significant, $t(35) = -2.27$, $p = .03$, representing a medium sized effect, $d = 0.68$ (see Figure 3.4). This finding suggests participants are better able to complete a course of CCBT for anxiety disorders than they are for depression.

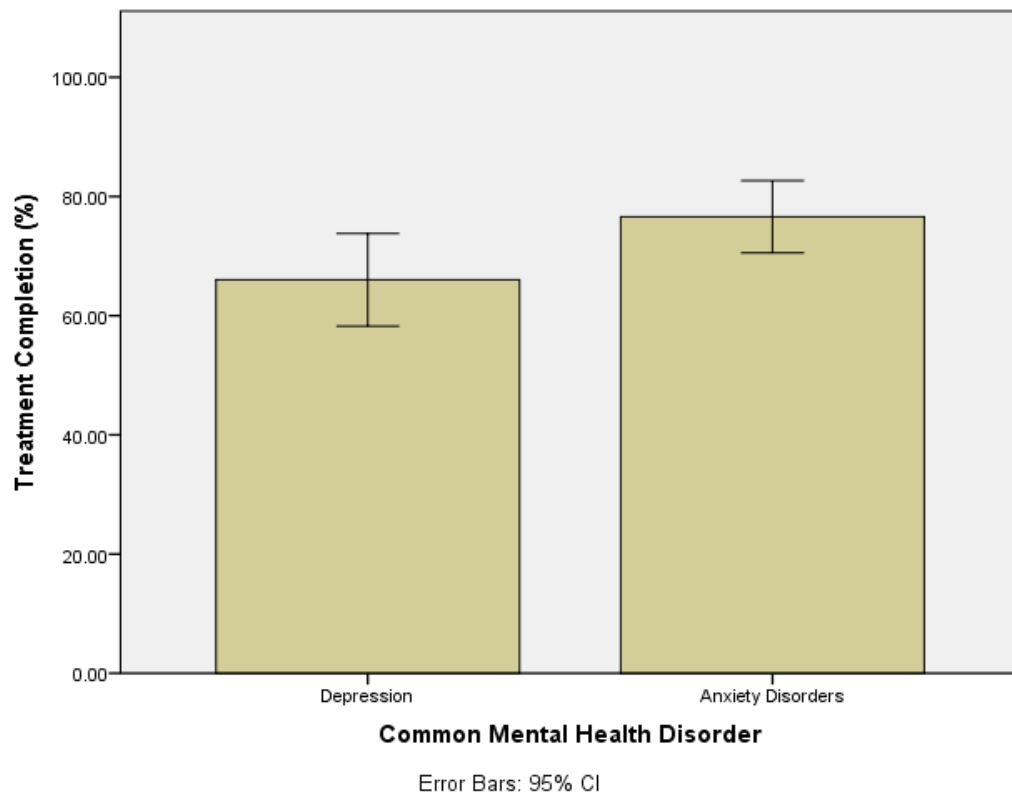


Figure 3.4. Bar chart illustrating treatment completion by common mental health disorder

Program factors and treatment completion. An independent samples t – test was used to determine whether the mean treatment completion differed by program media, that is, programs delivered by the internet or stand-alone PC packages. On average, programs delivered via the internet had a higher treatment completion of 73% ($M = 73.21$, $S.D = 15.96$) compared to programs that were stand-alone PC packages,

which had a mean treatment completion of 67% ($M = 66.70$, $S.D = 10.91$). This difference, -6.51 , BCa 95% CI $[-14.67, 2.87]$, was not statistically significant, $t(35) = -1.19$, $p = .24$, but did represent a medium sized effect, $d = 0.60$.

Provider factors and treatment completion. A two way (referral; self or other x level of support; guided, unguided) independent ANOVA was conducted with CCBT treatment completion as the dependent variable. There was a non-significant main effect of referral type on CCBT completion, $F(1, 33) = 0.09$, $p = .76$, $\eta^2 = .003$. There was also a non – significant main effect of type of support of CCBT completion, $F(1, 33) = 0.19$, $p = .67$, $\eta^2 = .01$. The role of therapeutic support was also investigated by using a correlation analysis. There was a non – significant correlation between the mean amounts of support time (per participant for the duration of each study) and program completion, $r = .14$ $[-0.35, 0.59]$ $p = .26$. Overall these findings suggests CCBT completion does not significantly differ according to whether the participants self – referred into the study or were referred by clinicians. It also suggests that CCBT completion does not significantly differ according to whether the program is supported or not.

In order to determine whether any aspects of therapeutic support influenced treatment completion, a three way (support medium; remote or in person, support structure; individualised or standardised and support provider; therapist or other professional) ANOVA was conducted with CCBT completion as the dependent variable. There was a non – significant main effect of support medium on CCBT completion, $F(1, 20) = 3.73$, $p = .07$, $\eta^2 = .16$. There was a non – significant main effect of support structure on CCBT completion, $F(1, 20) = 1.62$, $p = .22$, $\eta^2 = .08$. There was a non – significant main effect of support provider on CCBT completion, $F(1, 20) = 0.24$, $p = .63$, $\eta^2 = .01$. These findings suggest program completion does not significantly differ

according to whether support is provided remotely or in person, whether support is individualised or standardised, or whether support is provided by a clinician or another assistant.

3.4. Discussion

This review aimed to investigate the rates of CCBT uptake, completion, attrition and factors influencing engagement with CCBT for common mental health disorders. 37 studies were included in the final analyses. Uptake into CCBT research studies was typically low, only 12% of people who were interested or approached to take part actually began a trial. Completion rates of CCBT were generally good, with 67.41% of people beginning a CCBT trial completing the program within the allotted study timeframe. Analyses demonstrated a positive correlation between use of psychotropic medications and program uptake. No other person factors were associated with uptake rates. Uptake did not significantly differ according to type of referral or whether programs were guided or unguided. The age of study participants was significantly correlated with treatment completion. A significant negative relationship indicated as age increased treatment completion decreased. Medication status was also associated with treatment completion. A significant positive relationship between medication status and treatment completion indicated that as the percentage of CCBT participants using psychotropic medication during the study increased so too did treatment completion. Treatment completion also significantly differed according to programs targeting depression and anxiety disorders. Programs treating anxiety disorders had a significantly higher treatment completion compared to programs treating depression. Program and provider factors did not significantly influence treatment completion.

Uptake, attrition and completion

The uptake rate for the studies included in this systematic review was low at only 11.69%. These figures are slightly higher than those reported by Waller and Gilbody (2009) of 9.65%. These figures also fall within the uptake range reported by Kaltenthaler, Sutcliffe et al. (2008) which ranged between 3.3% and 25%. This suggests uptake into CCBT studies may have improved since 2009, either due to better CCBT acceptability or the increase of internet based platforms. The attrition rate for the studies in the current review was 31.38% which is within the range seen for attrition from traditional CBT which ranges from 5% to 38% (Watkins and Williams, 1998). This figure is slightly lower than the attrition rate reported in a previous analysis (31.75%, Kaltenthaler, Sutcliffe et al., 2008). This may be because the definition of attrition in the present review is more conservative than that of previous reviews, as attrition not only encompassed participants formally withdrawing but also included those who did not complete the program within the duration of the study. The fact the attrition rate is within that evidenced in traditional CBT is encouraging as it suggests computerised therapy is as acceptable as therapy delivered face to face. Treatment completion was typically 67%, which is higher than figures previously reported (56%, Waller & Gilbody, 2009). These attrition and completion figures are encouraging as they suggest CCBT is as acceptable and engaging as face to face CBT.

Person factors and engagement

Age. The present analysis offers the first quantitative analysis as to relationship between age and engagement with CCBT for CMHDs. Age was not a significant predictor of uptake but was a significant predictor of treatment completion. Specifically, as age increased treatment completion decreased. This finding suggests older age adults may not engage well with CCBT and this type of intervention may be more acceptable

to younger populations. This finding helps clarify conflicting results from previous research and reviews. Melville, Casey & Kavanagh (2010) present a review looking at variables associated with drop out from internet based treatments for psychological disorders. Of 13 studies reporting on variables associated with drop out from internet based programs, Melville et al. (2010) report conflicting results with regards to the influence of age, with one trial reporting a significantly lower age of the drop out group (33 years) than the completer group (38 years; Lange et al., 2003). The finding of the present review also conflicts with the results of some research trials which report no significant differences in age between completer groups and non - completer groups (Berger et al., 2011; Cavanagh, et al., 2006; Learmonth & Rai, 2008; Spek et al., 2008, Speck et al., 2007).

As the majority of CCBT programs in the present review were delivered via the internet (73%) this likelihood for older populations to drop out of CCBT programs may reflect a general trend of internet usage behaviour in older adults. A survey by the Office of National Statistics (2010) indicated that although internet use is growing, 18% of all UK adults had never been online because they did not want to or could not afford it. This non – usage group included 60% of people ages 65 and older and 22% of people ages 55 to 64. One study of 38 service users exploring attitudes towards CCBT in older people found just under half (44.74%) would be willing to try CCBT (Elsegood & Powell, 2008). Additionally, a thematic analysis of qualitative responses in the same study revealed seven negative themes regarding CCBT use and only one positive theme. However, evidence suggests there is no influence of age on pre – treatment attitudes to CCBT (Cavanagh et al., 2009). Although older populations may be willing to try CCBT if approached by a research team, once beginning a program their engagement may reflect the general trends of internet usage reported by older age adults, and the

difficulties older populations experience with technology as expressed in the Elsegood and Powell study (2008).

Furthermore, a meta – analysis of the factors influencing the effectiveness of CCBT for CMHDs presented in chapter one found age to be a significant moderator of effect sizes. Specifically there existed a significant negative relationship age and effect size. This indicated CCBT was more effective for populations of younger adults than for populations of older groups. The finding from the present analysis that as age increases, treatment completion decreases may help explain this moderating effect of age on effectiveness of CCBT.

Gender. The percentage of female participants in a CCBT sample did not significantly predict or influence uptake, treatment completion. This suggests there are no significant gender differences in engagement with CCBT. CCBT does not appear to be more suitable for one gender. This is an interesting finding given previous speculation that CCBT may be particularly appealing to young males (Proudfoot, 2004) and the finding from one study that female participants tended to give more positive feedback about a CCBT program and find it more helpful than the males in the sample (Cavanagh et al., 2009). These previous findings suggest males may be more likely to begin CCBT but females more likely to complete. The finding gender does not appear to influence engagement does however corroborate some previous findings suggesting no significant difference between completer and non – completer groups based on gender (Berger et al., 2011; Cavanagh et al., 2006; Clarke et al., 2009; Learmonth & Rai, 2008; Spek et al., 2008; Spek et al., 2007). It also reflects the trend evidenced in attrition from traditional therapy which suggests gender is not a significant factor (Bados et al., 2007; Wierzbicki & Pekarik, 1993). Overall, gender does not appear to significantly influence engagement with CCBT.

Education. The percentage of a CCBT sample completing university education did not significantly correlate with uptake or treatment completion. This suggests that completion of higher education does not influence engagement with CCBT. This finding conflicts with the majority consensus and research findings that suggest fewer years spent in education is a risk factor for attrition from psychotherapy (Wierzbicki & Pekarik, 1993) and CBT (Salmoiraghi & Sambhi, 2010). Although evidence from primary CCBT research trials is conflicting (Spek et al., 2007; Spek et al., 2008), it appears education does not influence uptake or treatment completion with regards to CCBT. This is encouraging as it suggests CCBT may be accessible to a wide population of individuals, regardless of educational background.

Medication. The percentage of a CCBT sample using pharmacotherapy for the treatment of a CMHD during the study significantly correlated with uptake. This suggests individuals using medication to treat a CMHD are more likely to use CCBT. There was also a significant positive correlation between medication status and treatment completion, indicating engagement with CCBT increased if participants were using psychotropic medication. This review is the first to analyse the relationship between medication status, uptake and adherence to CCBT. The benefit of dual modality treatment on mental health treatment adherence has been evidenced previously (Edlund et al., 2002). Using an epidemiological survey, Edlund et al. (2002) showed respondents receiving both pharmacotherapy and psychotherapy were more likely to remain in and complete treatment than respondents using a single modality treatment. Similarly, evidence from clinical trials has shown that participants assigned into integrative treatment conditions in which they receive both pharmacotherapy and psychotherapy for depression are more likely to adhere to treatment than participants assigned to a single – modality treatment arm (Katon et al., 1999). This finding may

reflect a general willingness on the part of the individual to engage with mental health treatments in general; a person already complying with a medical regimen may be more accepting of a psychological intervention and more willing to continue engagement. This finding has significant implications for the delivery of CCBT in routine care and in the wider population.

Treatment History. The percentage of CCBT participants reporting no previous psychological treatment for a CMHD was not significantly correlated with uptake or treatment completion. It is plausible to assume that a negative or positive experience with previous psychological treatments would influence the approach patients may take to CCBT and consequently their engagement with it. However, previous treatment history does not appear to influence engagement with CCBT. Due to the fact that relatively few studies reported information on participant treatment history ($N = 12$) this variable requires further investigation.

Problem factors

Across this sample of studies, program uptake did not significantly differ according to whether the study program was targeting depression or anxiety disorders. Firstly this suggests programs for depression are not more popular than those for anxiety or vice versa. It also implies there is no significant difference in the stringency of inclusion or exclusion criteria for depression or anxiety programs. This finding is positive as it suggests CCBT is acceptable for individuals experiencing both depression and anxiety disorders. Treatment completion did significantly differ according to type of CMHD being targeted however. On average, programs treating anxiety disorders had a higher treatment completion of compared to programs treating depression. This finding is important as it suggests that symptoms of depression such as low energy, helplessness and poor concentration may impede engagement with CCBT. Therefore,

patients with depression may require more support to keep motivation and adhere to a course of CCBT. This finding is consistent with previous research showing lack of motivation due to depressive symptoms is a reason for dropping out of CCBT research trials (Klein et al., 2006; Richards et al., 2006). This finding is also consistent with previous research showing depression (but not anxiety) as a risk factor for non-compliance with both psychiatric and physical medical treatment (DiMatteo, Lepper & Croghan, 2000).

Program factors

Program uptake and treatment completion significantly differed according to whether the program was delivered as a stand-alone PC package or via the internet. Specifically, higher program uptake and higher treatment completion was evident in which studies used PC packages as opposed to the internet. On reflection it is possible that this higher uptake and treatment completion may be the consequence of the research design utilised in the studies using PC packages. Studies using PC packages would be targeted at specific groups of people (e.g. people visiting GP surgeries) and the reach of PC packages is smaller than internet based programs. Therefore the difference between those approached to take part in the study and those actually beginning a study may be smaller than that seen in internet based studies. Furthermore in these studies, participants were required to travel to and complete CCBT sessions in primary care settings, for example, specialist CBT units (Learmonth et al., 2008), self-help centres (Kenwright et al., 2001) and GP surgeries (Proudfoot et al., 2004). Study participants would therefore have invested a lot in travelling to the study location and have been motivated to complete the program and the study by the research team and any other connections they may have made at the research location. This may have had motivating effects on treatment completion. These confounding factors make it difficult

to judge what the ‘true’ influencing factor may be. This is reflected in the fact that there was significant covariance between delivery platform and research protocol ($r = 0.37$, BCa CI [-0.66 to 0.01], $p = .02$). Therefore it is currently not possible to test the hypothesis regarding which factor(s) are responsible for higher uptake and completion in PC packages as studies have not varied these factors orthogonally.

Provider factors

Referral Source. Referral source did not significantly influence uptake or treatment completion. This suggests engagement was not influenced by whether participants were self – referred or were referred by a health professional. This finding contradicts previous research in the field of traditional therapy in which clients referred by health professionals experience high levels of pressure to change, lower levels of engagement and higher rates of attrition compared to self-referred clients (Chamberlain, Patterson, Reid, Kavanaugh, & Forgatch, 1984). This finding does however corroborate the results from one previous CCBT research trial which analysed the effect of referral source on treatment outcome and attrition; Mataix – Cols, et al. (2006) report a study in which GP referred participants improved the most on clinical outcome measures, followed by self-referrals and mental health professional referrals. Mataix – Cols et al. (2006) also found no significant difference between referral groups on uptake or completion between groups. This suggests clients referred by health professionals, likely in clinical settings, are at no more risk of attrition than self-referred clients, typically in non-clinical settings. This also suggests CCBT is an acceptable treatment option for individuals both in health care settings and in the general population.

Support. In the present analysis there were no statistically significant differences between guided and unguided programs on measures of treatment uptake or completion. Furthermore, in studies using guided programs, the total amount of support

time did not significantly predict treatment completion. This result conflicts with the main consensus from previous research that support improves adherence with CCBT. For example, Hilvert-Bruce, Rossouw, Wong, Sunderland & Andrews (2012) report that patients who were offered additional therapist contact were significantly more likely to complete the full CCBT course than patients who did not receive support. Reviews also report unguided programs have lower adherence than programs with minimal therapist contact (Newman et al., 2011; Spek et al., 2007). This result also contradicts qualitative research in which participants report additional support is needed in CCBT to maintain discipline to complete the program and to reduce social isolation (Gerhards et al., 2010; Hind et al., 2010). Furthermore, it is maintained that clinician contact may serve to make the participant feel like someone is concerned about their progress thereby forming a wish to fulfil the expectations that a participant may perceive the clinician to have (Hilvert-Bruce et al., 2012).

However, the result there are no significant differences between guided and unguided programs confirms some previous findings from experimental comparisons. A recent RCT comparing unguided, guided and step up support on demand programs for social phobia revealed no significant difference between groups on primary outcome measures, dropout rates, or adherence measures (Berger et al., 2011).

Overall the present analysis failed to find any significant effect of support time on engagement with CCBT. Due to the effort to investigate the role of support as both a dichotomous variable (guided vs. unguided programs; allowing an analysis as to differences between groups on engagement metrics based on support) and a continuous variable (total support time given to participants in minutes; allowing an analysis as to the relationship between support time and engagement) it seems unlikely that this failure to find a significant effect of support is due to the methodology employed. It

may be that this result is the consequence of the relatively low statistical power of the analysis.

Limitations

There are limitations to the present review. Limitations with the method of data analysis concern issues with power and weighting of studies. Firstly, the power of the presented analysis is dependent on the number of studies included. Many studies included in the analysis did not report certain participant demographic information. Only 16 out of 37 studies reported information on participant treatment history, 16 reported medication use and only 12 studies reported on participant treatment history. As analyses with low statistical power have a reduced ability to detect a true effect the conclusions drawn from these correlational analyses should be viewed in light of this. As a meta – analysis was not conducted on the data there was no opportunity to allow for the weighting of studies. Larger studies are deemed to have better sampling adequacy and in meta analyses are weighted higher than smaller studies. In the present analysis very small and very large studies were weighted equally meaning these studies contributed equal value to the analysis regardless of sample size. This is likely to have introduced imprecision in the analysis, results and subsequent conclusions drawn from them.

The length of treatment has not been investigated as a variable which may influence engagement. It may be that shorter CCBT programs result in higher adherence and this would be beneficial to investigate in further research. In regards to the investigation of the process based model of engagement it appears that only behavioural levels of engagement have been investigated in the present review. This is because studies typically report behavioural measures of engagement, such as attrition rate and

completion rates, but far fewer (if any) report participants' cognitive and emotional aspects of engagement, such as how much active attention is given to the program or affective responses to the program. These variables deserve further investigation in order to permit a clearer picture of why individuals do or do not engage with CCBT programs. Finally, the results and conclusions are based on group level data for each study included in the analysis. It may therefore be premature to conclude that the non – predictors do not influence CCBT uptake and engagement outside of research trials. When assessing client suitability for CCBT these factors may still need be considered. Future research trials should investigate these factors in order to corroborate these findings.

Implications for theory, research and practice

Returning to the process based model of engagement outlined in the introduction, the results of this analysis suggests medication status, age and type of CMHD should be included as factors influencing engagement with CCBT (as illustrated in Figure 3.5). The person factor of medication status augments both CCBT uptake and program completion. As the number of participants taking psychotropic medication at the time of recruitment into studies increased so too did program uptake and completion. This suggests use of pharmacotherapy significantly increases engagement with CCBT. Treatment completion was also significantly higher in programs targeting anxiety disorders than depression. This suggests CCBT may be particularly suited to those experiencing anxiety disorders and those experiencing depression may require extra support to maintain motivation and complete the program. A negative association between participant ages and program completion may indicate CCBT may be particularly suited to younger individuals.

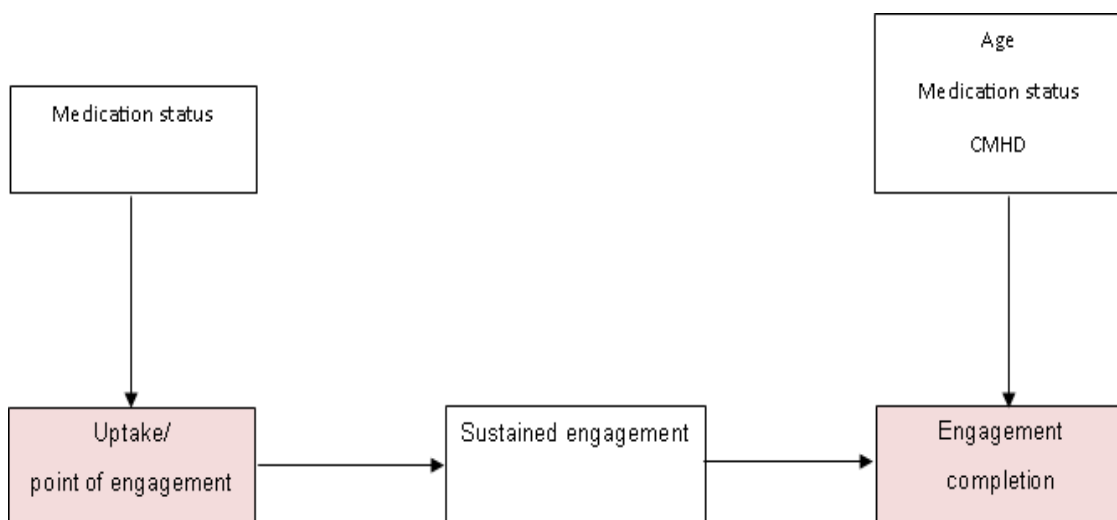


Figure 3.5. Illustration of the process based model of engagement and how concurrent psychotropic medication use (medication status) is positively related to CCBT uptake and how age, medication status and type of CMHD is associated with CCBT program completion.

The Four P's model that describes four core factors associated with CCBT engagement and disengagement (Cavanagh & Millings, 2013b) has been explored in this review. Although not all aspects of these factors could be explored in this analysis, the results of this review do provide some corroboration that these factors influence engagement with CCBT, at least on a group level. In particular, person factors of age and medication status, and problem factors of type of CMHD appear to hold significant associations with CCBT engagement.

In practice, these results may provide some preliminary evidence which could assist in assessing whether a person is suitable for a program of CCBT. An individual who is currently taking psychotropic medication, of a younger generation and/or are experiencing an anxiety disorder may be particularly well suited to using CCBT. An

individual who is not taking psychotropic medication and/or experiencing depression may require more assistance in CCBT engagement. This also suggests program designers may need to find ways of helping people with these profiles engage with CCBT, by program tailoring or adaptations. Future research should continue to investigate these factors by employing more robust tests of the model of predictors emerging from this study.

Conclusions

This review is the first to explore and analyse the variables which influence engagement with CCBT for CMHDs. This analysis of 37 randomised controlled and open trials found uptake was low but treatment completion was generally good and within the range evidenced in face to face therapies. Use of psychotropic medications were associated with increased CCBT uptake and increased treatment completion. This implies dual modality treatment is beneficial for engagement. There existed a negative correlation between the age of study participants and treatment completion. This suggests delivery of CCBT programs may require tailoring to meet the needs of differing populations based on age and facilitate engagement. Treatment completion was significantly higher in studies using programs targeting anxiety disorders. This suggests individuals experiencing depression either found CCBT less acceptable than those experiencing an anxiety disorder or require more support to complete the program... It is evident that these variables are associated with CCBT engagement on a group level, however a more fine grained analysis in naturalistic study settings is necessary to provide further support for these conclusions. Furthermore, the conceptualisation of CCBT uptake as a behavioural measure requires expansion to

explore cognitive aspects of this variable such as indicators of treatment acceptability.

This will be addressed in empirical Study 1 in the following chapter.

Chapter 4

The acceptability of CCBT for depression in a student population and links to adult attachment

4.1. Introduction

The acceptability and preference for treatments is an important area for investigation because it is associated with treatment seeking, attrition and outcomes (Tarrier, Liversidge & Gregg, 2006; Houle et al., 2013). The more acceptable and preferable a treatment is, the more likely it is to be engaged with on a meaningful level (Witt, Elliot & Martins, 1985) and produce better clinical outcomes (Gelhorn et al., 2011; Mergl et al., 2011). Perceptions about available treatments also make a substantial difference to the course of action people take if they experience mental health problems (Jorm et al., 1997). For example, people who believe in the helpfulness of antidepressants are twice as likely to report using this treatment as those who do not believe antidepressants are helpful (Jorm et al., 2000). Individuals who do not find antidepressants an acceptable treatment option are likely to either reject their use or poorly comply with a drug regime (Simon et al., 1996). Similarly, traditional psychological interventions may be preferable for many (NICE, 2011a) but for others, counselling may be seen as embarrassing, difficult and a last resort (Kushner & Sher, 1989).

In the same way, CCBT is clinically effective but will not be an acceptable treatment option for all people (Kaltenthaler, Sutcliffe et al., 2008). If CCBT is being offered to people who do not want to use it in a stepped model of care, the public health impact of this intervention will be substantially impeded. Outside of primary care

services, the efficacy, cost effectiveness and scalability of internet based CBT means there is considerable potential for widespread online dissemination (Mewton, Sachdev & Andrews, 2013). Furthermore, free to access, internet based CBT also has the capability to reach many individuals who may never use traditional mental health services (Christensen, Griffiths, Groves et al., 2006). Again, user perceptions of CCBT will either impede or augment the dissemination of these programs. Despite the importance of this variable, knowledge concerning CCBT acceptability is still limited (Andersson, 2010; Cavanagh et al., 2009; Kaltenthaler, Sutcliffe et al., 2008). Studies that have included an exploration into CCBT acceptability tend to use uptake and attrition rates as well as perceptions of treatment as indicators of CCBT acceptability (Gun, Titov & Andrews, 2011). Perceptions of CCBT tend to be operationalised as measures of treatment attitudes, treatment credibility and expectancy for symptom improvement (e.g. Cavanagh et al., 2009; de Graaf, Huibers, Riper, Gerhards & Arntz, 2009; Robinson et al., 2010).

CCBT acceptability

Evidence suggests widespread implementation of CCBT is being hampered by low uptake and high attrition (Kaltenthaler, Sutcliffe et al., 2008; Waller & Gilbody, 2009). Low uptake and high attrition may be related to public perceptions of CCBT. Reported perceptions of CCBT vary but generally pre – exposure perceptions do not appear to be overly positive. Mitchell and Gordon (2007) assessed attitudes towards a CD - ROM based CCBT program for depression in a student population ($N = 122$) both before and after CCBT exposure. Using the Credibility and Expectancy Questionnaire (Deville & Borkovec, 2000), results showed that credibility and preference for using CCBT were somewhat negative after a brief description of CCBT. The mean expectancy for improvement score was 34.7% which was interpreted as meaning

participants had moderately low expectancy for symptom improvement. Almost 10% of participants ranked CCBT as their first choice intervention, however, the perceived likelihood of using CCBT was only 47.6% for the sample. After demonstration of a CCBT program, credibility, expectancy and preference scores all rose by approximately 50%. This suggests that uptake to CCBT programs may be impeded by poor attitudes towards such programs and demonstrations of programs would help to improve attitudes and likelihood of treatment uptake.

Mitchell and Dunn (2007) also report a small scale pragmatic evaluation of CCBT in 12 students who had depression. In this study a different CCBT program (Beating the Blues) was offered to study participants. Pre – treatment credibility ($M = 19.67$ out of a possible 27) and expectancy (Mean of 66.7% out of a possible 100%) were higher than that reported in Mitchell & Gordon (2007). De Graff et al. (2009) also report a ‘moderately high’ pre – treatment credibility and expectancy for improvement ($M = 18.8$, $S.D = 4.0$ *Credibility* and $M = 18.3$, $S.D = 4.2$ *Expectancy*), both out of a possible 27) using an unguided online CBT program for depression in a sample of 200 participants. Cavanagh et al. (2009) present a pragmatic study of Beating the Blues (BTB) for the treatment of depression in primary and secondary care. Cavanagh et al. (2009) developed an Attitudes towards CCBT Questionnaire in order to assess treatment credibility, comprehensibility and planned compliance after viewing an introductory video of BTB. Results indicated average ratings for the BTB acceptability were higher than the midpoint (4) on all items of the ACCBT – Q. These results were interpreted as meaning patients found the program logical and engaging as well as having confidence in its benefits. More positive expectations of CCBT and higher treatment credibility predicted CCBT completion. This corroborates the association between credibility,

expectancy and adherence to CCBT treatment. Overall this study suggests that minimally guided CCBT is well accepted in routine care.

While these studies offer a picture of general CCBT acceptability, the results are based on data from participants who self – select or are referred by health professionals to be part of a CCBT trial. It is logical then to propose that the participants in these trials had some amount of interest in using a CCBT program, or at least would not be resistant to using it. CCBT may be acceptable for those willing to use it, but what about the people who do not wish to seek help in the form of CCBT? Data cannot be captured from people not involved in a research trial and so sparse information is available to explain why people refuse using CCBT or have no interest in it. Low uptake rates cannot be easily explained and the factors influencing CCBT acceptability and utilisation remain unexplored. Not only is knowledge concerning the acceptability of CCBT limited, but there is a paucity of research investigating the factors influencing why people do (or do not) seek help in the form of CCBT. Developing an understanding of the individual differences that influence choices to seek help in the form of CCBT would be invaluable. Potentially, such information could be used to predict who is likely to be interested in using CCBT and who would not. Using this information, open access programs could tailor treatment information by ‘playing up’ to the aspects of an individual that would switch them onto using CCBT. Similarly, Improving Access to Psychological Therapy services could target CCBT at specific groups of people who would be likely to use it, thereby matching treatment with client characteristics and freeing up other approaches for people more suited to them. Given the absence of theory – driven research into the factors influencing acceptability of CCBT it is necessary to draw information from the literature on help seeking in face to face therapies.

Attachment and treatment acceptability

As described in Chapter 1, individual differences in adult attachment styles have consistently been evidenced to influence help seeking behaviour. The attachment system in adulthood is believed to be activated in times of threat or distress, which is deemed relevant to the times when people seek psychological or therapeutic help (Smith et al., 2010). There is evidence to suggest people with different adult attachment patterns demonstrate different patterns of help seeking and make different use of psychological therapies (Daniel, 2006). For example, attachment security is associated with greater willingness to acknowledge personal distress, seek help and self – disclose in therapy (Mikulincer & Nachshon, 1991). Avoidant attachment is associated with being less likely to seek help, being more likely to reject it when offered and being less willing to self – disclose (Dozier, 1990; Korfmacher, 1997). Anxious attachment patterns are positively associated with acknowledging distress and seeking help but also a preoccupation and over – dependence on the therapeutic relationship (Daniel, 2006; Vogel & Wei, 2005). Attachment styles also influence the way people utilise health care services for physical illnesses. Results from a large sample of medical patients ($N = 701$) demonstrated how ‘preoccupied’ individuals (those high on attachment anxiety and low on attachment avoidance) and ‘fearful’ individuals (high anxiety, high avoidance) report a significantly higher number of physical symptoms than securely attached patients (Ciechanowski, Walker, Katon & Russo, 2002). This study also reported patients with a ‘preoccupied’ attachment had the highest primary care costs and utilisation whereas fearfully attached patients had the lowest, despite no significant differences in medical comorbidity between groups.

There has been suggestion that individual differences in attachment styles may be associated with engagement and outcomes in CCBT (Cavanagh & Millings, 2013a,

2013b). However, there is an absence of research investigating whether adult attachment styles are associated with utilisation of CCBT and consumption of self – help therapeutic interventions in general. Perhaps because of the presumed lack of the therapeutic relationship in self – help (Mitchell & Dunn, 2007) research has overlooked this key variable which has consistently been shown to influence traditional, face to face help seeking and in – treatment behaviour (Daniel, 2006). Individual differences in attachments impact how patients utilise physical health services (Ciechanowski et al., 2002; Hunter & Maunder, 2001) as well as traditional mental health services (Daniel, 2006; Goodwin, 2003; Smith et al., 2010). Does the prospect of reduced human therapeutic input drastically change these predictable patterns of influence? Applying attachment theory to the field of CCBT offers a unique perspective on how individual differences in attachment styles impact utilisation of minimally guided CCBT interventions.

Study aims and hypothesis

Previous work exploring the acceptability of CCBT in student populations (Mitchell & Dunn, 2007; Mitchell & Gordon, 2007) is now several years old. In the time since these studies were conducted CCBT has become a recommended treatment option for mild to moderate depression in the stepped model of care under the Improving Access to Psychological Therapies Initiative (NICE, 2011a). Given these considerable changes in the use of technology in health care, has the acceptability of CCBT in student populations also changed? Furthermore, is there any evidence that dispositional attachment styles are associated with CCBT acceptability and potential uptake (the beginning part of the process based model of engagement). The aims of this study are:

- (1) To explore the general acceptability of CCBT in a student population.

(2) To investigate whether adult attachment styles are associated with indicators of CCBT acceptability. These indicators include CCBT credibility, expectancy for symptom improvement by using CCBT, attitudes towards CCBT, CCBT acceptability and preference for CCBT.

Returning to the process – based model of engagement, this study will explore whether dispositional adult attachment styles are associated with indicators of CCBT acceptability, which represent cognitive aspects of program uptake (see Figure 4.1).

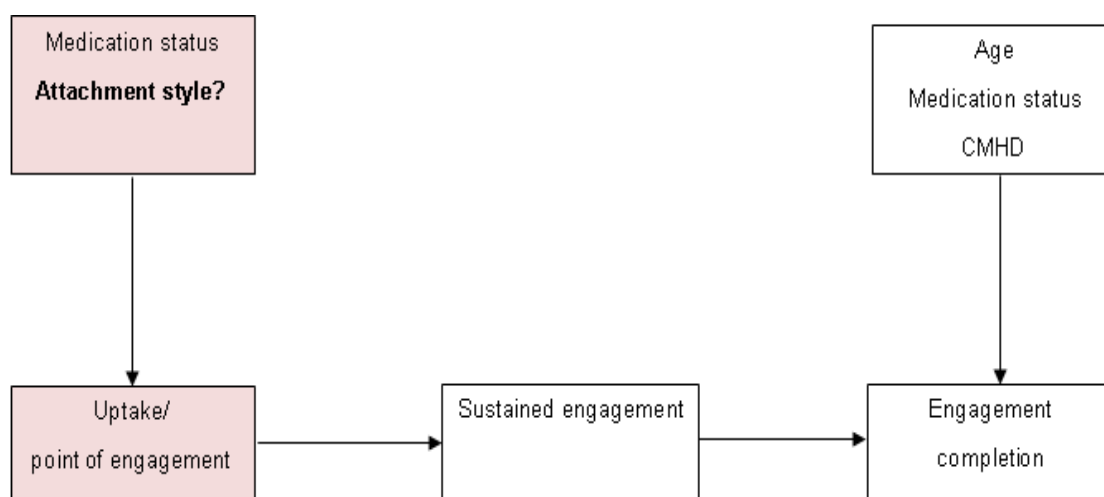


Figure 4.1. Diagram of the process – based model of CCBT engagement and adult attachment style as the main client factor of interest in this study.

While evidence suggests adult attachment will influence acceptability towards traditional face to face therapy this may or may not be demonstrated with regards to CCBT. By virtue of reduced human therapeutic contact, the interplay between client attachment patterns and acceptability of CCBT may differ. However given the absence of any empirical evidence to support this idea, it is hypothesised that if CCBT is

experienced in a similar way to traditional therapies then the relationship between adult attachment patterns and CCBT will mirror that of traditional therapies. Participants higher in attachment security are hypothesised to report higher CCBT acceptability, more positive attitudes towards CCBT, greater CCBT credibility and expectancy for improvement. Those high in attachment anxiety may be comparable to highly secure participants on acceptability indicators and so attachment anxiety will be positively associated with indicators of CCBT acceptability. Those high on attachment avoidance are likely to demonstrate lower CCBT acceptability, show more negative, resistant attitudes towards CCBT and worse CCBT credibility and expectancy. As such, it is proposed attachment avoidance will be negatively associated with indicators of CCBT acceptability.

4.2. Method

Participants

Two hundred and seventeen participants were recruited into the online study. Thirty - one were male (14.3%) and 186 (85.7%) were female. Ages ranged from 18 to 46 years ($M = 20.18$, $S.D = 4.28$). One hundred and eighty seven were of a White ethnicity (86.2 %), eight were of a mixed ethnicity (3.7 %), five were of a Black or Black British ethnicity (2.3 %), 11 were of an Asian or Asian British ethnicity (5.1 %), and six were of a Chinese ethnicity (2.8 %). Twenty one were taking prescribed medication to treat anxiety or depression (9.7 %) and 196 were not (90.3 %). Participants were all undergraduate students at the University of Sussex who took part in return for course credits. The studies in this thesis focused on student populations because university students represent a population of individuals who are at high risk for mental illness due to stresses associated with leaving home, financial pressures, academic pressures and the transition from adolescence to adulthood (Royal College of

Psychiatrists [RCP], 2011). Despite some perceptions that students are privileged young people and so their mental health demands should be lower than the general population (RCP, 2011), higher education students are a real mental health population whose mental health needs are increasing (Grant, 2011). There is therefore value in utilising student samples in CCBT research in order to determine its suitability for managing the mental health needs of people experiencing CMHDs in higher education. The study received ethical approval from the Cross-Schools Research Ethics Committee (C-REC) of the University of Sussex prior to commencement of the study.

Measures

Acceptability and preference for treatments -- acceptability & preference for treatments scale (APTS). The APTS is a self – report measure, created for the purposes of this study. It is intended to assess the acceptability and preference for NICE (2009b) recommended treatments for mild to moderate depression, delivered within Step 2 of the stepped model of care. These six treatments included: *Self – Help workbook, computerised cognitive behavioural therapy (CCBT), Physical exercise program, Cognitive behavioural therapy (CBT), Counselling and Antidepressant medication*. Participants were presented with a description of each treatment (what it involves and treatment duration) as it appears in the NICE (2009b) guidance ‘Understanding NICE guidance. *Information for people who use NHS services; treating depression in adults*’. The booklet is designed to help patients with depression understand the treatment choices available in the NHS and was used in this study to reflect the ‘real world’ informed choice patients should have in primary care. This is similar to the paradigm used by Tarrier et al., (2006) who investigated the acceptability and preference for psychological treatments currently available for PTSD (although they

did not explicitly use clinical guidance). For each treatment participants were asked the following questions adapted from those used by Tarrier et al., (2006):

- (1) How acceptable would this treatment be to you if you were experiencing mild to moderate depression?
- (2) How likely would you be to use this treatment if offered to you treat mild to moderate depression?
- (3) How likely is it that you would recommend this treatment to a friend if they were experiencing mild to moderate depression?

Responses for each treatment were given on a five point scale ranging from 1 (very unlikely) to 5 (very likely). These responses were summed to yield a score out of 15, with a higher score indicating higher acceptability and preference. Acceptability and preference for CCBT and comparisons with other depression treatments were of particular relevance for the purposes of this study. Tarrier et al., (2006) do not report psychometric data for their sample, however for this sample the APTS showed acceptable internal consistency, with Cronbach's α being 0.71 for the whole scale and good internal consistency for the CCBT subscale, $\alpha = .88$.

Attitudes Toward Seeking Professional Psychological Help Scale – Short Form - Adapted (Fischer & Farina, 1995). The ATSPPHS – SF is a 10 item, shortened and modernised version of the original 29 – item measure (Fischer & Turner, 1970). The ATSPPHS – SF is a unidimensional measure of attitudes towards seeking professional mental health treatment with higher scores indicating more positive attitudes towards help seeking. The wording was adapted for use in this study, for example, item 6 of the original, short form “I might want counselling in the future” was adapted to read “I might want to use CCBT in the future”. Participants responded on a 1 (strongly disagree) to 5 (strongly agree) scale. The ATSPPHS and the ATSPPHS – SF

remain the only standardised measures of mental health treatment attitudes that has been both psychometrically investigated and utilised in a number of studies (Elhai, Schweinle & Anderson, 2008). The ATSPPHS – SF has demonstrated good reliability ranging from 0.82 to 0.84 (Fischer and Farina, 1995; Komiya et al., 2000; Constantine, 2002). In the present sample, the adapted measure also demonstrated good internal consistency ($\alpha = .72$).

Credibility and expectancy questionnaire - adapted (CEQ – A; Devilly & Borkovec, 2000). The Credibility and Expectancy Questionnaire is a brief, six item self-report measure designed to assess treatment credibility and expectancy for symptom improvement. The questionnaire has two subscales, one relating to treatment credibility (3 cognitively based items) and the other tapping into expectancy for improvement (3 affectively based items). Responses are made on a 5 point Likert scale, ranging from 1 (very illogical/unsuccessful/unconfident) to 5 (very logical/successful/confident). For the present study the CEQ was adapted to relate to use of CCBT only and participants were asked to answer the questions as if they were experiencing symptoms of mild to moderate depression. Many studies which have added a focus on CCBT credibility have included this measure (de Graaf, et al., 2009; Robinson et al., 2010; Titov, Andrews, Schwencke, Drobny & Einstein, 2008; Titov, Andrews, Schwencke, 2008). In Devilly & Borkovec's (2000) original samples this scale demonstrated high internal consistency within each factor with a standardized $\alpha = 0.90$ for the expectancy factor, $\alpha = 0.86$ for the credibility factor, and a standardized $\alpha = 0.85$ for the whole scale. The CEQ – A showed good internal consistency for this sample, with Cronbach's $\alpha = .79$ for the credibility subscale, standardised $\alpha = .83$ for the expectancy subscale and standardised $\alpha = 0.88$ for the whole scale.

The Experiences in Close Relationships Scale – Adapted (ECR – A; Brennan, Clark & Shaver, 1998; Rowe & Carnelley, 2003). The Experiences in Close Relationships Scale (ECR) is a 36 item self – report measure of adult attachment. This study used an adapted version of the scale which centred on close relationships overall, as opposed to just romantic relationships. This has been successfully applied in previous attachment research (Carnelley & Rowe, 2007; Rowe & Carnelley 2003). The scale taps into two orthogonal continuous attachment dimensions of anxiety and avoidance. The anxiety subscale comprises of 18 items and taps fears of rejection and preoccupation with abandonment. The avoidance subscale (also 18 items) measures fears of intimacy and dependency. Participants respond on a seven point scale and the two subscales are scored independently, with higher scores pointing to greater attachment anxiety and attachment avoidance, respectively. Although attachment is viewed as a dimensional construct the ECR also maps onto the four category model of attachment (Bartholomew & Horowitz, 1991). Rowe & Carnelley (2003) report good internal consistency for their adapted ECR with $\alpha = .76$ for the avoidance subscale and $\alpha = .79$ for the anxiety subscale. In the present study reliability for both scales were excellent with Cronbach's alpha being $\alpha = .91$ for avoidance and $\alpha = .92$ for anxiety.

Patient Health Questionnaire for Depression and Anxiety 4 (PHQ – 4; Kroenke, Spitzer, Williams & Lowe, 2009). The PHQ – 4 is a brief anxiety and depression screening instrument combining the PHQ – 2 and the GAD – 2. Respondents are asked to report the frequency with which they have been troubled by problems (such as feeling nervous and feeling down) over the past two weeks. A total score is calculated by adding the scores for each of the four items. It is also possible to categorise respondents by the severity of their symptoms. This ranges from normal (0 – 2), mild (3 – 5), moderate (6-8), to severe (9-12). Kroenke et al., (2009) report the PHQ

has demonstrated good reliability with $\alpha = 0.82$ and $\alpha = 0.81$ for the anxiety and depression subscales respectively. In the present sample the PHQ – 4 showed good reliability with $\alpha = .83$ for the depression subscale and $\alpha = .88$ for the anxiety subscale.

Procedure

All participants completed this study online over the Bristol Online Survey administration system. Respondents were asked to read information derived from NICE (2009b) guidance on depression treatments. This information included a description of the symptoms of mild to moderate depression, the causes of depression and the prevalence of depression in the UK. Keeping this information in mind, participants then completed the ATSPPHS – SFA measure. Next, participants reported on their attitudes towards CCBT and completed the CEQ – A. Adult attachment style was measured using the Experiences in Close Relationships Scale (ECR – A), and depression and anxiety symptoms using the Patient Health Questionnaire 4 (PHQ – 4). The procedure ended with a full online debriefing.

4.3. Results

Descriptive statistics

The demographic characteristics of the 217 participants who took part in the study are described in Table 4.1.

Table 4.1: Table describing the characteristics of the study participants (N = 217).

Demographic Variable	N (%)
Age <i>M (S.D)</i>	20.18 (4.28)
Gender	
<i>Male</i>	31 (14.3)
<i>Female</i>	186 (85.7)
Ethnicity	
<i>White</i>	187 (86.2)
<i>Mixed</i>	8 (3.7)
<i>Black or Black British</i>	5 (2.3)
<i>Asian or Asian British</i>	11 (5.1)
<i>Chinese</i>	6 (2.8)
Medication	
<i>Yes</i>	21 (9.7)
<i>No</i>	196 (90.3)
PHQ – 4 <i>M (S.D)</i>	3.84 (3.14)

The general acceptability of CCBT in a student population

Descriptive data on the APTS CCBT, attitudes towards using CCBT and the credibility and expectancy questionnaire were explored in order to investigate the acceptability of CCBT. The mean score on each scale was also compared against the neutral midpoint¹⁵ for that scale using a one sample t – test. This was deemed relevant to determine whether opinions about CCBT were positive, beyond what is considered neutral.

The acceptability of CCBT as measured by the APTS CCBT subscale was generally positive. Overall, CCBT had an average acceptability rating of 11 out of a possible 15 ($M = 10.83$, $S.D = 2.94$) and a t test revealed this acceptability was significantly higher than the subscale midpoint ($t(216) = 9.20$, $p < .001$). This is in keeping with the overall scale in which participants had a mean APTS score of 66 ($M =$

¹⁵ The neutral midpoint for each scale was calculated as the response scale midpoint multiplied by the total number of items for that scale.

66.75, $S.D = 7.92$) out of a possible 90. This mean score for all participants was significantly higher than the neutral midpoint ($t(216) = 22.30, p < .001$) meaning overall, participants had generally positive views of the acceptability for depression treatments, including CCBT. Attitudes towards using CCBT were also generally positive, with participants typically reporting a mean score of 32 ($M = 31.58, S.D = 5.65$) out of a possible 50. A one – sample t test revealed this mean was significantly higher than the midpoint ($t(216) = 4.12, p < .001$), indicating this sample had generally positive attitudes towards using CCBT. However, ratings of treatment credibility and expectancy for symptom improvement were less positive. Participants reported a mean treatment credibility score of 9 out of a possible 15 ($M = 9.30, S.D = 2.41$). A one sample t – test showed mean credibility scores were not significantly different from the neutral midpoint; $t(216) = 1.83, p = .07$. Participants had a mean expectancy score of 8 out of a possible 15 ($M = 7.94, S.D = 2.82$) and these mean expectancy scores were significantly lower than the scale neutral midpoint; $t(216) = -5.04, p < .001$. This suggests low expectancy for symptom improvement using CCBT. Overall, participants had a mean total CEQ – A score of 17 out of a possible 30 ($M = 17.24, S.D = 4.82$). These mean scores were significantly lower than the neutral midpoint (18); $t(216) = -2.31, p = .02$. This suggests treatment credibility and expectancy for improvement was low. Table 4.2 reports these t – test results. Overall it appears that although attitudes and acceptability of CCBT were generally positive, credibility and expectancy for improvement from using CCBT were low.

Table 4.2: Descriptive statistics for each main variable of analysis and results of t – tests determining whether mean responses were higher or lower than the scale midpoint.

Measure	Minimum	Maximum	<i>M</i>	<i>S.E</i>	<i>S.D</i>	<i>t – test</i>
APTS CCBT	3.00	15.00	10.83	.20	2.94	$t(216) = 9.20^{**}$
APTS	29.00	89.00	66.58	.56	8.31	$t(216) = 22.30^{**}$
ATSPPHS – SFA	10.00	50.00	31.57	.38	5.65	$t(216) = 4.11^{**}$
CEQ – A	6.00	30.00	17.24	.33	4.82	$t(216) = -2.31^*$

Note: Minimum and Maximum refer to the possible lowest and highest scores for each scale. $^{**} p < .001$, $^* p < .05$

The influence of descriptive variables on CCBT acceptability. A series of analyses were conducted to determine whether the descriptive variables of age, gender and mental health were associated with the acceptability of CCBT.

Age. A bivariate correlation indicated a significant negative relationship between age and the APTS CCBT subscale; $r = -.17$, 95% BCa CI¹⁶ [-0.31, -0.01], $p = .01$. This showed as age increased attitudes and preference for CCBT decreased. This relationship is illustrated in Figure 4.2. To determine whether CCBT acceptability could be predicted by age, a simple regression analysis was conducted with age as the predictor and acceptability for CCBT as the outcome. Results indicated that age accounted for 2.8% of the variation ($R^2 = .028$) and significantly predicted scores of CCBT acceptability; $F(1, 215) = 6.12$, $p = .01$. Model parameters indicated age significantly predicted CCBT acceptability and as age increased, CCBT acceptability decreased; $\beta = -.17$, [-0.20, -0.01], $t(215) = -2.47$, $p = .01$. Age did not significantly

¹⁶ Bias corrected and accelerated bootstrap 95% confidence intervals are reported in square brackets throughout the remainder of the report unless stated otherwise.

correlate with attitudes towards using CCBT ($r = -.05$, $[-0.18, 0.10]$, $p = .43$) or credibility and expectancy ($r_s = -.05$, $[-0.19, 0.09]$, $p = .51$).

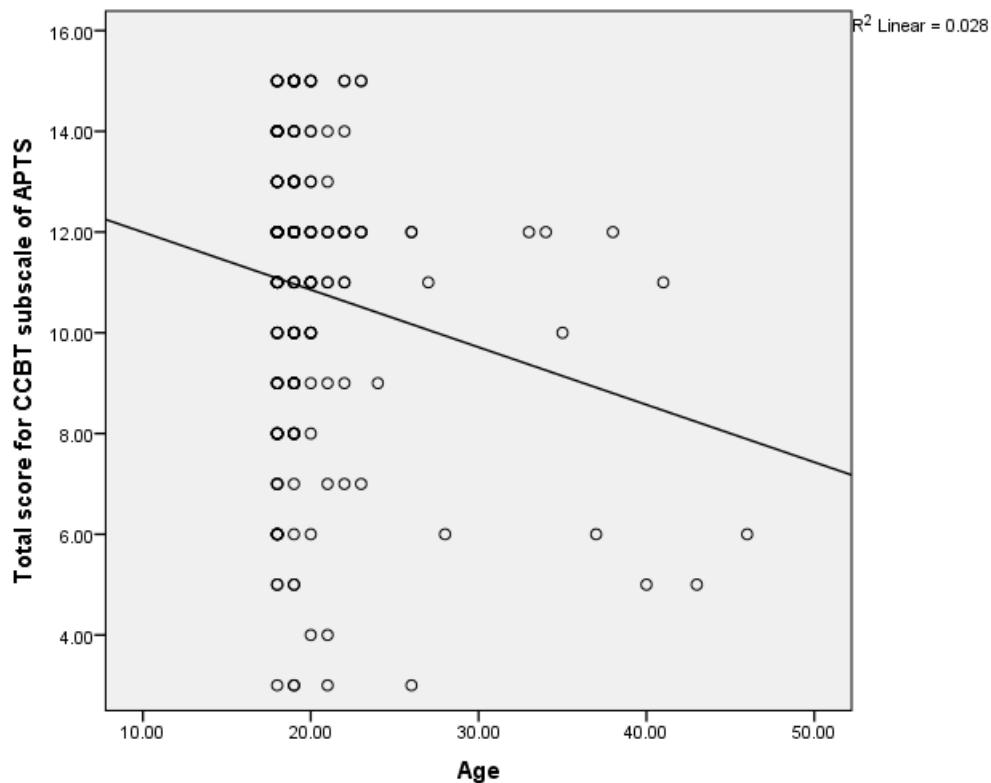


Figure 4.2. Figure illustrating the significant negative relationship between participant age and acceptability and preference for CCBT treatment.

Gender. A one – way (gender; male, female) multivariate analysis of variance was conducted with APTS – CCBT subscale, attitudes to CCBT and CEQ – A as the dependent variables. Descriptive statistics indicated females had higher scores on all outcomes than males. For females; APTS – CCBT, $M = 10.93$, $S.D = 2.91$, ATSPPHS – SFA, $M = 31.87$, $S.D = 5.65$, CEQ – A $M = 17.55$, $S.D = 4.79$. For males; APTS – CCBT $M = 10.42$, $S.D = 3.05$, ATSPPHS – SFA, $M = 29.81$, $S.D = 6.20$ and CEQ – A $M = 15.65$, $S.D = 4.70$. Levene’s test indicated the assumption of equal variances had been met (all p ’s $>.05$) and Box’s M was non-significant ($F(10, 12413.34) = 0.91$, $p = .53$, Box’s M = 9.52) meaning the assumption of equality of covariance matrices had

been met and MANOVA was appropriate. Using Pillai's trace, results indicated no significant effect of gender on these outcomes; $V = 0.03$ $F(4, 209) = 1.37$, $p = .25$.

Given the main MANOVA analysis was not significant, univariate main effects are not reported. Overall participant gender did not significantly affect perceptions of CCBT.

Mental Health. Correlation analysis showed no significant relationship between PHQ – 4 scores and APTS CCBT ($r = -.02$, $[-0.15, 0.11]$, $p = .87$), attitudes to using CCBT ($r = -.01$, $[-0.14, 0.12]$, $p = .90$), or CCBT credibility and expectancy for improvement ($r = -.05$, $[-0.18, 0.09]$, $p = .50$). Overall, these results suggest the acceptability of CCBT may not be influenced by the severity of depression and anxiety symptoms.

The preference for CCBT compared to other depression treatment options

To determine whether CCBT was comparable in terms of acceptability and preference to other treatments typically available within the NHS, a one way, repeated measures ANOVA was conducted on the APTS data. For this analysis the repeated measures variable was type of treatment (workbook, CCBT, exercise, face to face CBT, counselling and antidepressant medication). Mauchly's test of sphericity indicated the assumption of sphericity had been violated; $\chi^2(14) = 179.48$, $p < .001$. The associated epsilon values were $\epsilon > .75$ therefore the Huynh – Feldt correction is reported. The main ANOVA analysis showed a significant main effect of treatment on APTS scores; $F(3.97, 858.10) = 83.36$, $p < .001$. Overall, there was a significant difference in treatment acceptability and preference. The estimated marginal means (bias corrected and accelerated bootstrap 95% CIs are reported in square brackets) show that CBT has the highest acceptability and preference ($M = 13.37$ $[13.06, 13.65]$, $S.D = 2.26$), followed by counselling ($M = 12.89$, $[12.56, 13.22]$, $S.D = 2.28$), then group exercise classes ($M = 10.96$, $[10.56, 11.36]$ $S.D = 3.00$), next CCBT ($M = 10.83$, $[10.42, 11.19]$, $S.D = 2.94$),

self-help workbook ($M = 9.47$, $[9.06, 9.85]$, $S.D = 3.08$). Antidepressant medication had the lowest acceptability and preference; ($M = 9.06$, $[8.57, 9.56]$, $S.D = 3.70$). These means are illustrated in Figure 4.3. Pairwise comparisons showed all of these means were significantly different from each other (all $p < .05$) except for two comparisons; self-help workbook vs. antidepressant medication (mean difference $= .41$, $p = 1.00$) and CCBT vs. exercise (mean difference $= .12$, $p = 1.00$). Therefore, although there was a significant effect of treatment on APTS, there were no significant differences between workbook and medication. There were also no significant differences between the acceptability and preference for CCBT and exercise, meaning they are both ranked 3rd in terms of preference.

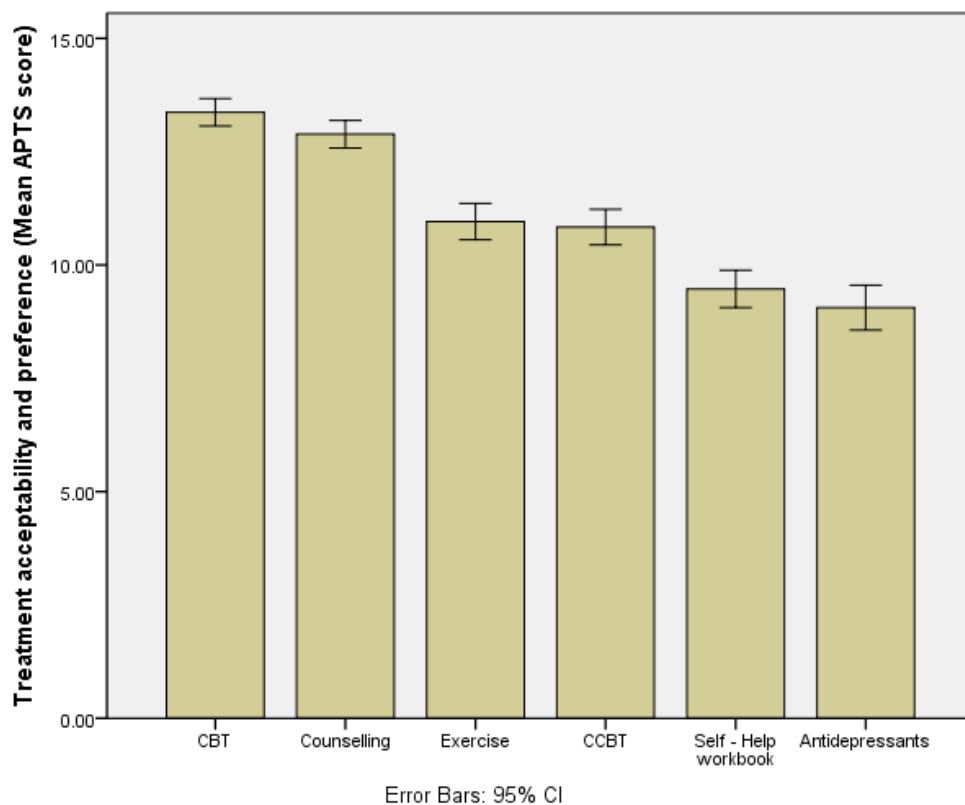


Figure 4.3. The overall acceptability and preference for each depression treatment.

Attachment and indicators of CCBT Acceptability

In order to assess whether dispositional adult attachment predicted scores on indicators of CCBT acceptability a series of multiple regression analyses were conducted in which mean centred attachment anxiety and mean centred attachment avoidance were entered as predictors in Step 1. The interaction term (calculated as mean centred anxiety * mean centred avoidance) was entered as a predictor in Step 2. It is necessary to include the interaction term in order to statistically represent the highly insecure aspect of Bartholomew and Horowitz's (1991) attachment prototypes (fearful – avoidant), which is an additive, interaction between the anxiety and avoidance dimensions. This form of analysis is consistent with previous attachment research (e.g. Carnelley & Rowe, 2007; Rowe et al., 2012). Bias corrected and accelerated bootstrap 95% CIs are reported in square brackets.

Attachment and attitudes towards using CCBT. Hierarchical multiple regression analysis was conducted with ATSPPHS – SFA score as the outcome. Results showed a multiple correlation between attachment anxiety, attachment avoidance and attitudes to using CCBT of $R = .12$. Step 1 accounted for only 1.4% of the variance in attitudes scores ($R^2 = .014$) and did not significantly predict scores on the ATSPPHS – SFA scale; $F(2, 214) = 1.55, p = .22$. The addition of the interaction term in Step 2 increased the variance accounted to only 1.5% ($R^2 = .015, R^2_{\text{change}} = .001$). Furthermore, including the interaction term did not significantly improve the ability to predict scores on the scale; $F(3, 213) = 1.06, p = .37$. For Step 2, model parameters showed none of the variables significantly contributed the model. For attachment anxiety, $\beta = .10 [-0.24, 1.29], t(213) = 1.47, p = .14$, for attachment avoidance $\beta = -.07 [-1.19, 0.37], t(213) = -1.04, p = .30$ and for the attachment interaction term $\beta = -.02 [-0.78, 0.68], t(213) = -.29,$

$p = .77$. All model parameters are reported in Table 4.3. It appears adult attachment is does not predict people's attitudes towards using CCBT.

Acceptability and preference for CCBT. Multiple regression analysis showed that for Step 1 in which attachment anxiety and avoidance were entered this accounted for 0.5% of the variance in APTS CCBT scores ($R^2 = .005$). Consequentially, Model 1 did not significantly predict acceptability and preference for CCBT; $F(2, 214) = .54, p = .59$. Entering the interaction term into Model 2 increased the amount of variance accounted for to 0.6% ($R^2 = .006$) representing an R^2 change of only .001. Model 2 did not significantly improve ability to predict APTS CCBT scores; $F(3, 213) = .40, p = .76$. None of the attachment variables made a significant contribution to the model. For anxiety $\beta = .07, [-.163, .588], t(213) = 1.02, p = .31$. For avoidance $\beta = .02, [-.333, .414], t(213) = .24, p = .81$ and for the interaction, $\beta = .02, [-.304, .431], t(213) = .35, p = .73$. See Table 4.4 for full model parameters. Overall, attachment does not appear to predict acceptability and preference for CCBT¹⁷.

CCBT credibility and expectancy. Results from the multiple regression analysis with CEQ – A as the outcome showed the following. When anxiety and avoidance were entered into Step 1, 0.3% of the variance in CEQ – A scores was accounted for ($R^2 = .003$) and there was a multiple correlation with the CEQ – A of $R = .06$. Model 1 did not significantly predict scores on the CEQ – A: $F(2, 214) = .38, p = .71$. The inclusion of the interaction in Model 2 increased the variance accounted for to only 0.6% ($R^2 = .006, R^{2 \text{ change}} = .003$). The interaction did not significantly increase the ability to predict scores on the CEQ – A; $F(3, 213) = .44, p = .73$ and $F^{\text{change}}(1, 213) = .63, p = .43$. The model parameters (see Table 4.5) show none of the attachment variables made significant contributions to the model: for attachment anxiety $\beta = .02, [-$

¹⁷ As a matter of interest a hierarchical multiple regression conducted with APTS total scores as the outcome variable indicated attachment anxiety positively predicted scores on the APTS total scale.

.484, .649], $t(213) = .32, p = .75$. For attachment avoidance $\beta = -.05, [-.864, .331], t(213) = -.75, p = .45$. For the interaction, $\beta = -.06 [-.766, .345], t(213) = -.80, p = .45$.

Overall, it is illustrated that attachment does not significantly predict CCBT credibility or expectancy for improvement.

Table 4.3: Linear model of attachment as predictors of Attitudes towards using CCBT, with 95% bias corrected and accelerated confidence intervals reported in the parentheses. Confidence intervals and standard errors based on 1000 bootstrap samples.

	<i>b</i>	SE β	β	<i>p</i>
Step 1				
Constant	31.56 (30.84, 32.26)	0.38		$p < .001$
Anxiety	0.55 (-0.21, 1.30)	0.36	.11	$p = .125$
Avoidance	-0.38 (-1.19, 0.38)	0.37	-.07	$p = .303$
Step 2				
Constant	31.59 (30.86, 32.29)	0.39		$p < .001$
Anxiety	0.53 (-0.24, 1.29)	0.36	.10	$p = .144$
Avoidance	-0.38 (-1.19, 0.37)	0.37	-.07	$p = .300$
Interaction	-0.09 (-0.78, 0.68)	0.32	-.02	$p = .774$

Note $R^2 = .014$ for Step 1; $\Delta R^2 = .001$ for Step 2.

Table 4.4: Linear model of attachment as predictors of CCBT acceptability, with 95% bias corrected and accelerated confidence intervals reported in the parentheses.

Confidence intervals and standard errors based on 1000 bootstrap samples.

	<i>b</i>	SE β	β	<i>p</i>
Step 1				
Constant	10.83 (10.44, 11.22)	0.20		$p < .001$
Anxiety	0.18 (-0.17, 0.55)	0.20	.07	$p = .331$
Avoidance	0.04 (-0.32, 0.41)	0.19	.02	$p = .822$
Step 2				
Constant	10.83 (10.44, 11.22)	0.20		$p < .001$
Anxiety	0.19 (-0.16, 0.55)	0.20	.07	$p = .309$
Avoidance	0.05 (-0.33, 0.41)	0.19	.02	$p = .814$
Interaction	0.06 (-0.30, 0.43)	0.17	.02	$p = .725$

Note $R^2 = .005$ for Step 1; $\Delta R^2 = .001$ for Step 2.

Table 4.5: Linear model of attachment as predictors of CEQ – A, with 95% bias corrected and accelerated confidence intervals reported in the parentheses. Confidence intervals and standard errors based on 1000 bootstrap samples.

	<i>b</i>	SE β	β	<i>p</i>
Step 1				
Constant	17.24 (16.56, 17.91)	0.33		$p < .001$
Anxiety	0.14 (-0.49, 0.75)	0.30	.03	$p = .641$
Avoidance	-0.23 (-0.83, 0.34)	0.31	-.05	$p = .468$
Step 2				
Constant	17.27 (16.60, 17.94)	0.33		$p < .001$
Anxiety	0.10 (-0.48, 0.65)	0.30	.02	$p = .748$
Avoidance	-0.24 (-0.86, 0.33)	0.32	-.05	$p = .454$
interaction	-0.22 (-0.77, 0.35)	0.28	-.06	$p = .427$

Note $R^2 = .003$ for Step 1; $\Delta R^2 = .003$ for Step 2.

4.4. Discussion

The primary aim of this study was to provide a contemporary insight into the acceptability of CCBT for depression in a student population. Opinions of CCBT tended to be good, with ratings of acceptability and treatment attitudes being highly positive. In contrast, the credibility of CCBT and expectancy for symptom improvement was not rated highly. This suggests that although people may see CCBT as acceptable, they remain unconvinced of its credibility and effectiveness as a treatment for mild to moderate depression. In terms of preference for CCBT in relation to other treatments for depression, CCBT was ranked 3rd along with exercise. Traditional CBT and counselling were the most preferred treatments. Indicators of CCBT acceptability were generally unrelated to demographic variables, except age was negatively correlated with the APTS CCBT subscale. A secondary aim of this study was to investigate whether adult attachment styles are associated with CCBT acceptability. Correlations and multiple regression analyses showed adult attachment was not significantly associated with any indicators of CCBT acceptability or attitudes.

The acceptability of CCBT in a student population

The acceptability of CCBT was generally positive with average ratings of CCBT acceptability being higher than the neutral midpoint for the APTS CCBT subscale. This suggests that CCBT is an acceptable treatment option for mild to moderate depression. Attitudes towards using CCBT were generally positive, with participants typically reporting a mean score of 32 ($M = 31.58$, $S.D = 5.65$) out of a possible 50. A one – sample t test revealed this mean was significantly higher than the midpoint indicating this sample held positive attitudes towards using CCBT. This is encouraging as it suggests CCBT may be an attractive treatment option for some. These findings are consistent with a previous study in which university students with an unmet need for

psychological help reported positive attitudes towards a web – based CBT program (Lintvedt et al., 2008). Raw scores of student attitudes are not reported in the Lintvedt paper so unfortunately direct comparisons cannot be made. The results from the present study do however extend the findings of Lintvedt et al.,(2008) to include students both with and without an unmet need for psychological help and suggests that CCBT may be an acceptable treatment option for individuals in a student population.

These findings are noteworthy because attitudes towards CCBT have been shown to predict intentions to use CCBT (Lintvedt et al., 2008) and therefore as attitudes towards CCBT become more positive, intentions of using CCBT increase. Positive attitudes therefore increase likelihood of CCBT uptake (the beginning point of the process based model of CCBT engagement). This means that CCBT has the potential to reach a population of people (students) for whom psychological help is increasingly needed (Royal College of Psychiatrists [RCP], 2011). That being said, based on a description of CCBT presented to participants, the mean CEQ – A ratings were significantly lower than the neutral midpoint. This suggests participants expect little treatment success, are unlikely to recommend CCBT to a friend and find CCBT somewhat illogical. It also suggests participants did not believe a CCBT program would be particularly helpful in reducing symptoms of depression. This finding is consistent with the Mitchell and Gordon (2007) study which also found CCBT credibility was below the neutral midpoint on average, indicating credibility was generally negative. The credibility ratings for CCBT in the current study, although slightly higher than the Mitchell and Gordon study, are based on a five, not nine point scale. Borkovec and Costello (1993) and Borkovec, Newman, Pincus and Lytle. (2002) reported credibility figures of 6.95 and 7.58 respectively for therapist – guided CBT, which, once the difference in response scale is taken into consideration is slightly higher than the mean

credibility score found in the present study. Expectancy for symptom improvement was rated at 40.55% which is slightly higher than the 34.7% reported by the sample of students in Mitchell and Gordon's (2007) study. The expectancy for improvement percentage of 40.55% is however substantially lower than 67.5% expectancy for improvement reported in regard to therapist – guided CBT (Borkovec et al., 2002). It appears that CCBT may not be a credible treatment option for student populations. This is discouraging, however there is initial evidence to suggest that ratings of CCBT credibility can be increased by a brief demonstration of CCBT (Mitchell & Gordon, 2007). As such, although initial credibility and expectancy may be a barrier to CCBT uptake, this may be overcome by providing a brief demonstration of the CCBT program. Demonstrations of the CCBT program may then be a valuable tool in increasing CCBT uptake.

Interestingly, pre – treatment credibility and expectancy scores tend to be higher in RCTs and non – controlled trials. For example, Klein et al. (2010) report a pre – treatment credibility rating of 67%, indicating relatively positive credibility of an online PTSD program. De Graff et al. (2009) report scores on the CEQ were moderately high for an unguided CCBT program for depression. Similarly, Cavanagh et al. (2009) report average ratings of CCBT credibility were higher than the midpoint, indicating positive treatment credibility. Trials also tend to report no significant difference between diagnostic groups (Carter, Bell & Colhoun, 2013) or no difference between treatment conditions, (typically CCBT versus a face to face therapy; Carlbring et al., 2003, Hedman et al., 2011, Kiropoulos et al., 2008) on credibility and expectancy scores. This may indicate that CEQ ratings in RCTs and non – controlled trials may not accurately reflect the credibility and expectancy of CCBT in 'real – world' dissemination.

The preference for CCBT in a student population

The preference for CCBT over other NICE (2011a) recommended treatments for depression suggested CCBT was not the most desirable, nor the least desirable treatment option. An ANOVA revealed the majority of treatments differed from each other in terms of preference. Therefore by ranking each treatment according to preference we see the following; CBT was the most acceptable and preferred treatment. Counselling was the second most acceptable and preferable. CCBT and group exercise classes ranked third in terms of acceptability and preference. Self – help work books and antidepressant medication were the least acceptable and preferable treatment options. These results show that although face to face therapies (CBT and counselling) were rated as more acceptable and preferable than CCBT, computerised CBT was rated as more acceptable and preferable than self – help work books and antidepressant medication.

These findings are consistent with two previous studies utilising student samples in the UK. Mitchell and Gordon (2007) found that the highest frequency of participants (54.9%) chose counselling as their preferred treatment choice, followed by ‘the internet’ and CCBT (17.2% and 9.8% respectively). ‘Other’ interventions such as medication (7.4%) and self -help books were the least preferred (6.6%). Similarly, the results of Tarrier et al., (2006) showed the top ranked treatments for PTSD were all face to face therapies including cognitive therapy and cognitive therapy with exposure. The lowest ranked treatments included CCBT and involved some sort of technology assistance bar one; psychodynamic psychotherapy, VR, computer-based therapy, EMD-R, and e-therapy. Overall these results suggest that CCBT is less preferable and acceptable than traditional therapies, however, it is more acceptable and preferable than self – help work books and psychotropic medication.

Descriptive variables

The finding that age was negatively associated with acceptability and preference for CCBT suggests CCBT may be more acceptable and preferable for younger adults. This finding adds to the trend between age and CCBT evidenced in the results of the meta - analysis presented in Chapter 2 and the results of the systematic analysis presented in Chapter 3. This finding is not consistent with previous research indicating no significant difference on pre-treatment attitudes to CCBT based on age (Cavanagh et al., 2009). However, individuals self – selecting to enter into a pragmatic trial may differ in terms of their pre- treatment attitudes compared to individuals who self – selected to enter into the present, non – experimental study in which CCBT exposure was not provided. However, the finding that participant gender did not influence pre – treatment attitudes towards CCBT is encouraging as it does not suggest gender is a limiting factor in CCBT dissemination, despite earlier speculation that CCBT may be particularly appealing to young males (Proudfoot, 2004).

Effects of adult attachment.

Adult attachment was not significantly associated with attitudes towards seeking help in the form of CCBT, nor the acceptability and preference for using CCBT. These findings do not support the study hypothesis which tentatively suggested that adult attachment may be associated with these variables in a fashion consistent with that evidenced in traditional therapies. It was hypothesised that individuals higher on attachment security may be more open to using CCBT; however no significant associations between attachment anxiety, attachment avoidance and ATSPPHS – SFA scores were found. One possible explanation for this finding may be that the idea of using CCBT did not sufficiently activate the internal working models of participants and so the effects of attachment on information processing were not evident.

Attachment is evidenced to influence *social* information processing (i.e. social information related to peers, romantic partners and parents), in such a way that highly secure individuals process socially relevant information in a positively biased way (Dykas & Cassidy, 2011). Where the idea of engaging with a human therapist may fall under the umbrella of ‘social information’ processing, perhaps the idea on engaging with a computerised form of therapy does not. As such the internal working model was not sufficiently activated to exert influence in this context.

Neither attachment anxiety nor avoidance were significantly related to CCBT credibility and expectancy. This finding may be due to two reasons. Firstly, this finding may have occurred because CEQ – A scores were consistently low (below the midpoint) and so none of the variables measured, including attachment and demographic variables, were significantly associated with CCBT credibility and expectancy. A so called ‘floor effect’ may be evident and a type II error has occurred. Second, this finding may reflect a true non – significant relationship between adult attachment CCBT credibility and expectancy. In this instance the thought of CCBT credibility and expectancy for improvement did not engage the adult attachment system and therefore the internal working models of self and others did not bear any influence on these outcomes. This could be due to the possibility that CCBT may be viewed as a – relational and so the perceptions and emotions concerning the self and others that are elicited by the internal working models of individuals are not triggered.

Limitations

Limitations of this study should be considered when interpreting the results provided. Although care was given during the study design to promote ecological validity within a student population, the study methodology meant participants had to imagine themselves in the position of someone experiencing mild to moderate

depression. The study did not have strict inclusion or exclusion criteria regarding a clinical diagnosis of depression which may have impacted the reliability of the results. However, participants were screened for symptoms of depression using the PHQ – 4 and 99 out of 217 respondents scored higher than the scale cut off for mildly severe depression (46%). A subsequent subgroup analysis utilising the 99 respondents experiencing mild depression (and above) showed the same pattern of results overall. The study was also specifically aimed at a student population and so these results should be generalised to a wider population with care. Finally, the results must be viewed within the constraints of a correlational study in which no firm conclusions about the direction of causality can be derived.

Implications for theory and research

The unique contribution to theory by this study that this research represents an attempt to investigate whether any relationships exist between adult attachment and indicators of CCBT acceptability. Adult attachment styles have been evidenced to influence help seeking and attitudes towards traditional face to face therapies (Daniel, 2006; Lecomte et al., 2008; Vogal & Wei, 2005). Given uptake into CCBT research trials and CCBT utilisation is typically low (Bennett & Glasgow, 2009; Waller & Gilbody, 2009) an understanding of how this variable is associated with pre – treatment perceptions of CCBT is both timely and essential to broaden our understanding of CCBT dissemination. Returning to the process based model of engagement as outlined in Chapter 3, this study has investigated how attachment could influence decisions surrounding *the point of engagement*. It is at this point that attachment styles may have an association with the cognitive aspects of uptake (deciding to begin therapy) and emotional/relational aspects (acceptance of beginning therapy and the therapeutic model).

Attachment did not appear to hold any association with pre – treatment CCBT credibility and expectancy for improvement. Credibility and expectancy were ominously negative in the current sample and this is consistent with previous research (Mitchell & Gordon, 2007). As pre – treatment credibility has been evidenced to influence program completion (Cavanagh et al., 2009), this suggests more needs to be done to enhance people's general perceptions of CCBT and its usefulness. The information which people are currently receiving about CCBT online may be tailored and updated with relevant evidence of effectiveness, testimonials from individuals who have used CCBT programs and taster sessions/demonstrations may also be of benefit (Mitchell & Gordon, 2007).

Furthermore, results indicate a negative correlation between age and CCBT acceptability and preference. This suggests CCBT may be particularly acceptable to younger adults and therefore research efforts should explore why CCBT may not be so acceptable to older adults, in order to reduce this barrier to CCBT uptake. Overall, it is possible to add client age onto the factors influencing CCBT engagement (see Figure 4.).

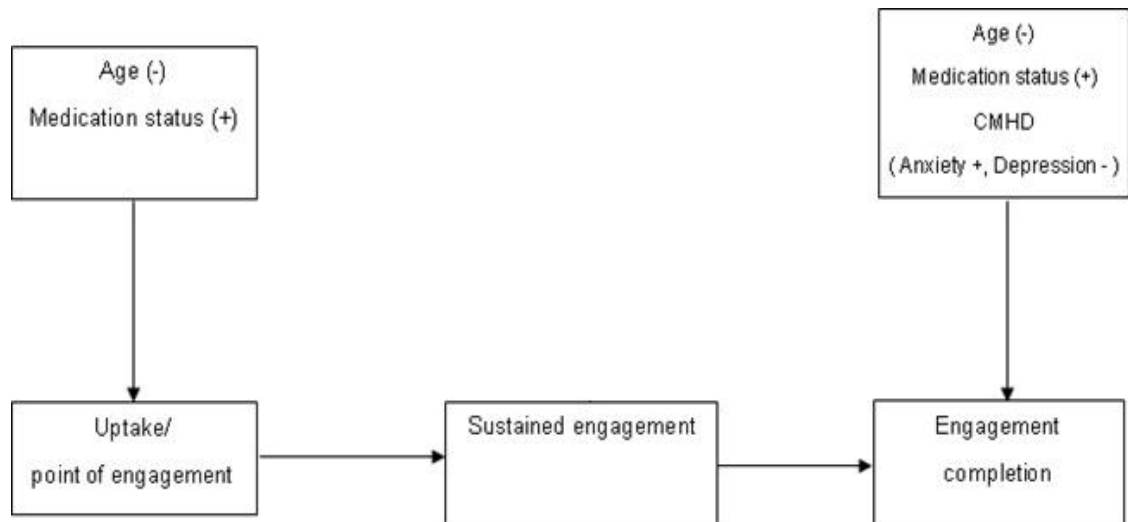


Figure 4.4. Diagram illustrating the process based model of CCBT engagement and the addition of age as a factor associated with program uptake.

Implications for practice

The APTS used in this study has given an insight into the general acceptability and preference for depression treatments amongst a student population. CCBT was the third most preferable and acceptable treatment option and was rated as more acceptable and preferable than a self – help workbook or anti – depressant medication. This coupled with the finding that overall, attitudes towards CCBT were positive, suggests there is value in offering CCBT in clinical practice, perhaps if patients are waiting for counselling or do not wish to take psychotropic medication. However, the finding that credibility and expectancy for improvement were pessimistic must not be overlooked. If indicative of general population perceptions of CCBT, the fact that participants did not perceive CCBT as particularly credible would signal poor uptake of CCBT in clinical practice and therefore the public health impact of CCBT impeded. Mitchell and Gordon (2007) also reported significantly low credibility and expectancy for their sample, and demonstrated a taster session of CCBT significantly improved CEQ scores. The results

of the present study would agree with the need for a CCBT demonstration in order to convince patients that CCBT is a credible treatment option.

Conclusions

This study offers a contemporary representation of the acceptability of CCBT for mild to moderate depression in a student population. Based on a sample of 217 individuals, results demonstrate the acceptability of and attitudes towards CCBT remain positive. Given the notable prevalence of mental health issues in student populations (RCP, 2011), these results suggest CCBT may be an acceptable treatment option for students experiencing mild to moderate depression. CCBT may therefore play a role in meeting the demand for psychological help in this population. Uptake of CCBT may be impeded by low credibility of CCBT and low expectancy for symptom improvement. Further research should continue to explore the role of CCBT demonstrations in overcoming this barrier to CCBT uptake.

The present study also offers a unique exploration into how adult attachment styles may be associated with pre – treatment acceptability of CCBT. Results showed that overall, adult attachment was not significantly associated with CCBT acceptability, attitudes or credibility/expectancy. Although these findings add to the body of literature seeking to determine for whom CCBT is suitable (Andersson, 2009), further research is required to investigate how adult attachment may be associated with in – treatment variables contributing to sustained engagement with CCBT (the treatment active part of the processed based model of engagement). Given the wealth of evidence suggesting adult attachment is associated with the therapeutic alliance and engagement with face to face therapies (Bachelor et al., 2010; Sauer et al., 2010; Smith et al., 2010) an exploration into whether these relationships are mirrored in CCBT remains timely, unexplored territory.

Chapter 5

The relationship between adult attachment orientation and CCBT in – vivo

5.1. Introduction

Study 1 described in Chapter 4 explored how adult attachment styles may be associated with indicators of CCBT acceptability, the uptake portion of the engagement model. This chapter aims to explore how adult attachment may be associated with the ‘sustained engagement’ aspect of the engagement model (the highlighted portion of Figure 5.1). Figure 5.1 illustrates the process – based model of engagement as outlined in Chapter 3 and the factors which this research has identified as relevant to CCBT uptake and completion. Where much of the research in the field of CCBT is heavily outcome focused, the process by which people are able to make use of CCBT is less understood (Purves & Dutton, 2013). This chapter presents two studies aimed at investigating the program – user interactions of guided and unguided CCBT. Furthermore, these studies aim to investigate the influence of adult attachment on the therapeutic process in guided and unguided CCBT.

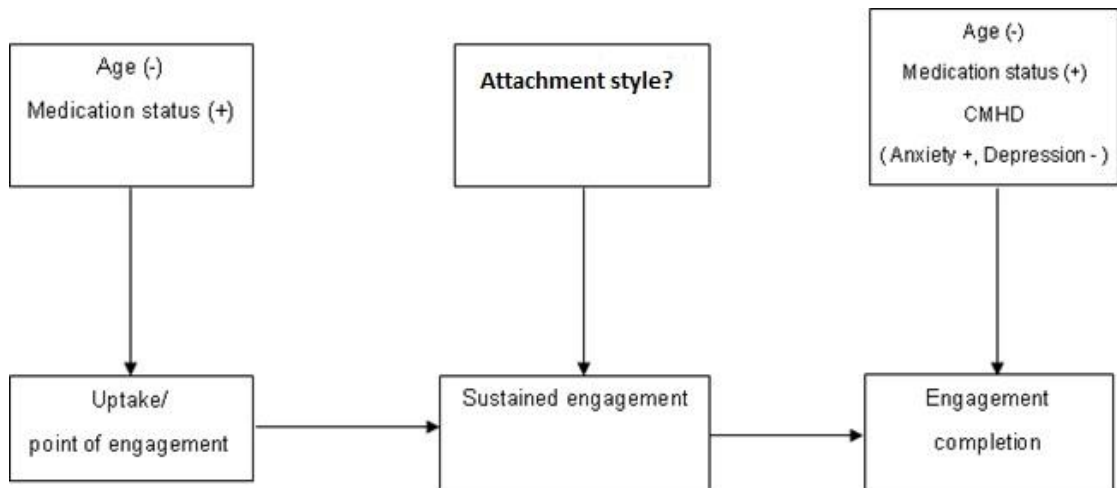


Figure 5.1. The process based model of engagement with CCBT and the factors influencing each stage already investigated. The highlighted portion of the model illustrates the aspect of the model under investigation in Studies 2a and 2b.

The therapeutic alliance.

The ‘substance’ of psychotherapies can essentially be divided into two distinct aspects; *specific* and *common* factors. Specific factors refer to specific techniques and interventions that characterise a particular therapy (Chatoor & Krupnick, 2001). Common factors refer to non – specific elements that materialise in all therapeutic situations and are independent of specific treatment techniques. Common factors may include empathy, the therapist's competence and the therapeutic alliance (Chatoor & Krupnick, 2001). Both common and specific factors influence outcomes in psychotherapy but debate remains over which bears the most importance. Estimates suggests common factors account for as much as 30% of the variance in psychotherapy outcomes, with specific factors accounting for approximately 15% (Lambert & Barley, 2002). However, proponents of specific factors maintain these factors are active causes of therapeutic change (Oei & Shuttlewood, 1996). The most frequently explored common factor in traditional therapy is the therapeutic alliance.

The therapeutic alliance, or working alliance, is “a summary term referring to a number of interpersonal processes at play in psychological treatment which...act in parallel to (and theoretically independently of) specific manualised treatment techniques” (Elvis & Green, 2008, p116). Bordin (1979) defined a pantheoretical, tripartite model of the alliance which consists of (a) client – therapist agreement on treatment goals, (b) agreement on the tasks required to achieve said goals and (c) the affective bond of liking, trust and attachment that develops between the client and therapist. Bordin (1979) also maintained that the alliance is a broad phenomenon independent from treatment modality and theoretical approach, i.e. a therapeutic common factor. Bordin’s model has become the most widely accepted definition of the therapeutic alliance.

Evidence suggests a good quality therapeutic alliance is imperative in producing positive therapy outcomes (Horvath & Symonds, 1991). Between 6 – 17% of variation in treatment outcomes may be accounted for by the quality of therapeutic relationships (Martin, Garske, & Davis, 2000; Messer & Wampold, 2002). Furthermore, meta-analyses have demonstrated the significant function of the therapeutic alliance in determining successful treatment outcome (Horvath & Symonds, 1991; Martin et al., 2000).

The therapeutic alliance in CCBT

In contrast to traditional psychotherapies, the therapeutic alliance has been studied to a much lesser extent in alternative treatment formats and self – help (Andersson et al., 2012). Furthermore, each context CCBT is delivered in (e.g. guided or unguided) represents a new challenge to the standard view of the therapeutic relationship as epitomised in the context of traditional face to face therapies (Cavanagh & Millings, 2013a).

The therapeutic alliance in guided CCBT. The role of the therapeutic relationship in guided CCBT is not apparent because there is a reduction in therapist contact and the client may not ever meet the therapist in person (Andersson et al., 2012). Guided CCBT does still provide therapeutic interaction however, either face to face, via email or via online forums. Furthermore there is evidence to suggest therapists use a combination of specific and common factors in email correspondence to clients which are designed to encourage users to continue working with the program (Paxling et al., 2013). Evidence from open trials also suggests the notion of a therapeutic alliance has face validity for program users. Ormrod et al., (2010) report a pilot study of 16 clients who used the Beating the Blues course as part of an adult mental health service. Results showed the mean item ratings of alliance were significantly higher than the neutral midpoint for the Agnew Relationship Measure (Agnew-Davies, Stiles, Hardy, Barkham, & Shapiro, 1998) and all subscales, indicating clients had a positive working alliance with the program. The authors tentatively suggest these results show the notion of a therapeutic alliance with CCBT has face validity and tended to be experienced positively. Therefore these programs may provide a somewhat relational environment for program users. However, the therapeutic alliance as experienced in vivo requires further investigation with a larger sample size and variety in programs.

Cavanagh (2010) proposed that in guided programs, the concept of the therapeutic alliance needs to be extended to incorporate the user, program and the program supporter in a 'triangle of alliance'. This is particularly relevant for how guided CCBT is implemented in the NHS as a low intensity treatment option for CMHDs in primary care (NICE, 2009a; 2011a). The role of low intensity workers is to aid clinical improvement and to assist the client in optimising use of predominantly self – managed interventions, like CCBT (DOH, 2008). Therapeutic contact should last between five –

ten minutes (DOH, 2008). As such, guided CCBT in the IAPT context represents a predominantly self – administered therapy (Newman et al., 2011). A question of importance for Study 2a is whether the adult attachment system is activated in this ‘triangle of alliance’ and whether dispositional attachment styles exert the same influence as they do in traditional, face to face therapies.

The therapeutic alliance in unguided CCBT. Pure self – help approaches in which there is little to no additional human therapeutic support, may present the greatest challenge to the traditional view of the therapeutic relationship (Cavanagh & Millings, 2013a). In unguided CCBT the therapist – client alliance becomes that of a computer – client alliance, dependent entirely on any relational features embedded in the program and the quality of human – computer interaction to foster a therapeutic alliance.

The idea that CBT specific factors can be successfully translated and delivered via a computerised format is generally accepted, however the idea that common factors may also be activated by CCBT programs is more controversial (Peck, 2010). Peck (2010) proposed that CCBT may activate common factors in the same way as traditional therapy because the therapeutic relationship is a “vehicle” which enables or impedes the activation of common and specific factors. In traditional therapy, the therapist is the only source of activation for these factors and those with good interpersonal skills facilitate transmission whereas ineffective therapists hinder it. This view is consistent with evidence showing large individual differences in therapist effectiveness, evidence that therapies can result in symptom deterioration, and how sudden gains can often happen early in treatment (Busch et al., 2006; Mohr, 1995; Lillienfeld, 2007).

In CCBT, there is no human therapeutic channel, particularly in the case of unguided CCBT. The transmission of common factors therefore relies heavily on the ability of the program itself to embody these relational features. The notion that self –

help can incorporate common factors is not new, as researchers have previously investigated the prevalence of common factors in written self – help (Richardson, Richards & Barkham, 2010). Richardson et al., (2010) found evidence that authors of three popular self – help books for depression used common factors in their writing, demonstrating these relational processes can be included in self – help. Furthermore, Richardson et al (2010) adapted a published model of common factors (Cahill et al., 2008) to provide a list of common factors to be incorporated into CBT based self – help (see Table 5.1).

Table 5.1: The three stages of the therapist – client relationship, the objectives of each stage and associated common and CBT specific factors (reproduced from Richardson & Richards, 2006).

	Objectives	Common factors	CBT specific factors
Establishing the relationship	Positive expectancies; Hope; Patient engagement	Empathy, warmth and genuineness; Negotiation of goals; Collaborative framework; Guidance	Assessment of patient; Formulation; Establishing therapist competence
Developing the relationship	Commitment; Trust in therapist; Openness to therapy	Developing a secure base; Feedback; Responsiveness	Education; Rationale giving; Initiating treatment
Maintaining the relationship	Satisfaction; Alliance; Emotional processing; Clinical improvement; Preventing drop out	Rupture repair; Flexibility and responsiveness	Specific treatment techniques; Problem solving; Relapse prevention

Drawing on this work, Barazzzone et al., (2012) presented a thematic analysis detailing how automated features of CCBT programs (Beating the Blues, MoodGYM and Living Life to the Full) embody aspects of the therapeutic alliance. Features designed to *establish* a relationship included: using digestible amounts of text and audio (being accessible), generating belief that the program is helpful by presenting author credentials and user testimonials (see Figure 5.2), generating belief in recovery by the

use of positive statements like ‘With practice, we can get rid of unhelpful thoughts in order to feel better and stay better’ (Beating the Blues). Empathy, warmth and unconditional acceptance are engendered through characters, positive statements and individualised responses. Negotiation of goals and a collaborative framework are developed through enabling users to set their own goals for therapy and encouraging users to collaborate with the program (using the pronoun ‘we’ and encouraging users to engage with the CBT techniques). Figure 5.3 shows a screen shot from Beating the Blues in which video vignettes of fictional characters are used to generate belief in recovery, helpfulness of the program and empathy. Figure 5.3 shows a character, describing the benefit of doing ‘pleasurable events’, i.e. behavioural activation. Features designed to *develop* the relationship included developing a secure base and feedback. Features designed to *maintain* the relationship included responsiveness, rupture prevention and repair and flexibility. Barazzone et al., (2012) conclude that despite concerns some CCBT programs do offer the basis for developing a therapeutic alliance with program users. There were however, fewer features designed to develop and maintain the relationship.

A rectangular box with a black border containing the text "Image removed due to copyright" in a large, bold, black sans-serif font.

Figure 5.2: Example from the Beating the Blues ® website which demonstrates accessible information about CBT treatment on the left and a user testimonial on the right.

A rectangular box with a black border containing the text "Image removed due to copyright" in a large, bold, black sans-serif font.

Figure 5.3: Video vignette of one of the characters in Beating the Blues ®, Heather, who is explaining how at first she did not believe that she would enjoy doing more activities, but in fact she did.

In accordance with Peck's (2010) propositions, there is evidence that automated alliance features embody common factors associated with establishing, developing and maintaining a therapeutic alliance. Therefore, aside from specific factors, experiences with CCBT have the potential to include features of a therapeutic relationship. How dispositional adult attachment styles are related to how people experience this therapeutic relationship in CCBT is unclear. Study 2b aims to address this question.

Adult attachment and the therapeutic alliance

As described in Chapter 1, the therapeutic alliance in traditional psychotherapy is influenced by a client's childhood attachment experiences (Bowlby, 1988). Individual differences in attachment styles mean people approach interpersonal relationships differently and so dispositional client attachment patterns impact the development and quality of therapeutic alliances (Daniel, 2006). Evidence suggests clients with a secure attachment pattern are able to form better quality therapeutic alliances and are more committed to therapy than individuals with insecure attachment styles (Dozier, 1990; Korfmacher, et al., 1997; Mallinckrodt et al., 1995; Mikulincer & Nachshon, 1991). Meta- analyses have also provided evidence for the association between secure attachment styles and strong therapeutic alliances (Diener, Hilsenroth & Weinberger, 2009; Diener & Monroe, 2011). While there is ample evidence for this association in traditional psychotherapies, no research has explored these associations in regard to CCBT.

Attachment and the therapeutic alliance in CCBT

Attachment styles may be relevant to the therapeutic alliance in CCBT for several reasons. Firstly, the attachment system is activated by physical or psychological threats (Bowlby, 1973) and so psychological distress, as experienced when suffering depression or anxiety will elicit attachment system activation. Upon activation, multiple

relational schemas (constituting the internal working model) are triggered and its elements become active through a process of spreading activation (Gillath et al., 2006). These activated elements include attachment – related goals. For secure individuals these goals include seeking protection and support through (real or imagined) proximity to attachment figures and obtaining a sense of ‘felt security’ (Sroufe & Waters, 1977). For highly anxious individuals, attachment – related goals may be to retain constant proximity to an attachment figure and for highly avoidant individual’s attachment – related goals would be to avoid the experience of vulnerability and dependency (Gillath et al., 2006). Activation of the attachment system therefore elicits activation of attachment – related goals, thoughts and feelings which influence engagement and the therapeutic alliance in traditional therapy (Diener et al., 2009). As such, individuals who are likely to use CCBT programs will already have their attachment systems activated due to the psychological threat they are experiencing.

Bowlby (1988) also maintained that the therapeutic relationship includes attributes which can activate the adult attachment system. In CCBT, the attachment system could also be activated by the common features embedded within the program designed to build a therapeutic relationship. CCBT may activate both specific and common factors in the same way that traditional, face to face therapy can activate them (Peck, 2010). If the proposition that CCBT activates specific and common factors in a similar way to traditional therapy is correct (Peck, 2010), then adult attachment may influence the therapeutic alliance and engagement in CCBT as it does in traditional therapy.

The role of human – computer interaction

Attachment system activation may not automatically imply these attachment – related goals and thoughts are applied to CCBT. The available evidence only relates to

how attachment styles are associated with engagement and the therapeutic alliance in traditional, face to face therapy – a fundamentally social interaction. For attachment system activation to be applicable in the context of CCBT the human – computer interaction may also need to be social in nature. The computers are social actors theory (Nass, Steuer & Tauber, 1994; Reeves & Nass, 1996) provides a framework for understanding how human – computer interactions can be social in nature.

Computers Are Social Actors (CASA) theory

The CASA theory, developed within the field of human – computer interaction, provides a framework for understanding how the therapeutic alliance may unfold in the human – computer dyad and how constructs relevant to social information processing, like the adult attachment system, can be relevant in these contexts. The computers are social actors theory states that when computers provide the user with minimal social cues the user will treat the computer as a social actor¹⁸ and unconsciously apply social rules and expectations to the computers they are interacting with (Nass et al., 1994). This is based on the idea that evolutionary pressures have demanded that components of social interactions be automated as pre – defined scripts which are then unconsciously applied in new social interactions (Langer, 1992). When a computer demonstrates minimal social cues the user mindlessly applies these automated pre – defined scripts to the computer they are interacting with, even though they consciously understand computers do not have human characteristics or deserve human like treatment (Nass et al., 1994). Through a series of experiments, using the CASA paradigm Nass and colleagues (1994; 2000) demonstrated that when using computers which provide appropriate social cues, people mindlessly¹⁹ apply social scripts and rules to the

¹⁸ This is otherwise known as ‘The Media Equation’ (Reeves & Nass, 1996).

¹⁹ In this context, Langer (1992) defined ‘mindless’ as meaning unconscious. The idea being that given our unequivocally social nature, components of social interactions have been automated (either by social learning and/or by evolutionary pressures) as pre – defined scripts which unconsciously influence

computer, essentially ignoring its asocial nature. These experiments have all utilised the following paradigm which also essentially underpins the methodology of the studies presented in this thesis²⁰:

1. From psychology literature, take one example of how human beings interact with and treat each other (human – human interaction)
2. Adapt the wording of the statement or theory to read “computer” instead of another human being. This statement then reflects how humans treat computers, not other people.
3. Run an experiment in which a human being is replaced with a computer and determine whether the attitudes and behaviours observed match what would be observed if two people were interacting. That is, does the social rule still apply?

Using this theory, Nass and colleagues have demonstrated how people apply various social rules and expectancies to computers. Examples include demonstrations that people are polite to computers (Nass, Moon & Carney, 1999), that people apply gender stereotypes to computers (Nass, Moon & Green, 1997) and that people respond socially to the computer itself (Nass & Sundar, 1996). More contemporary research has extended these findings to demonstrate that websites are also social actors (Karr - Wisniewski & Prietula, 2010). Such evidence is impressive and using this paradigm, the CASA theory has been verified with regard to over 100 social rules (Katagiri, Nass & Takeuchi, 2001). It is necessary for computers to provide minimal social cues to trigger these responses and therefore engagement of social responses to computers is contingent upon the social presence of the technology (Reeves & Nass, 1996). The minimal social cues required to produce social presence and trigger social responses to

interactions (Langer, 1992; Karr-Wisniewski & Prietula, 2010). The CASA theory states that given minimal social cues from computers, the asocial nature of the technology is overlooked and the social scripts are unconsciously still applied to the interaction.

²⁰ By replacing the human therapist with a computer program and changing the wording of measures such as the WAI to read “the program” as opposed to “my counsellor”.

computers are surprisingly simple and can include; language output (either text and/or audio output that sounds like a human voice), responses based on multiple prior inputs (e.g. interactivity) and the filling of roles traditionally filled by humans (Nass et al., 1994; Nass & Moon, 2000). These findings are explained as examples of how humans mindlessly overuse social categories, and engage in overlearned social behaviours with computers (Nass & Moon, 2000). Studies also demonstrated that participants were responding socially to the computer itself and not orienting their responses to some human agent or programmer “behind” the computer (Nass & Sundar, 1996).

The CASA theory and CCBT

The CASA paradigm has yet to be explicitly applied to the field of CCBT. It does appear however that CCBT programs possess minimal social cues. CCBT programs tend to be equipped with both text and voice output (see Figure 5.4), provide a level of interactivity for the user (multiple choice questions, free text responses, see Figure 5.5) and are essentially filling the role of a human therapist, particularly in unguided CCBT where no face to face human therapeutic support is provided.

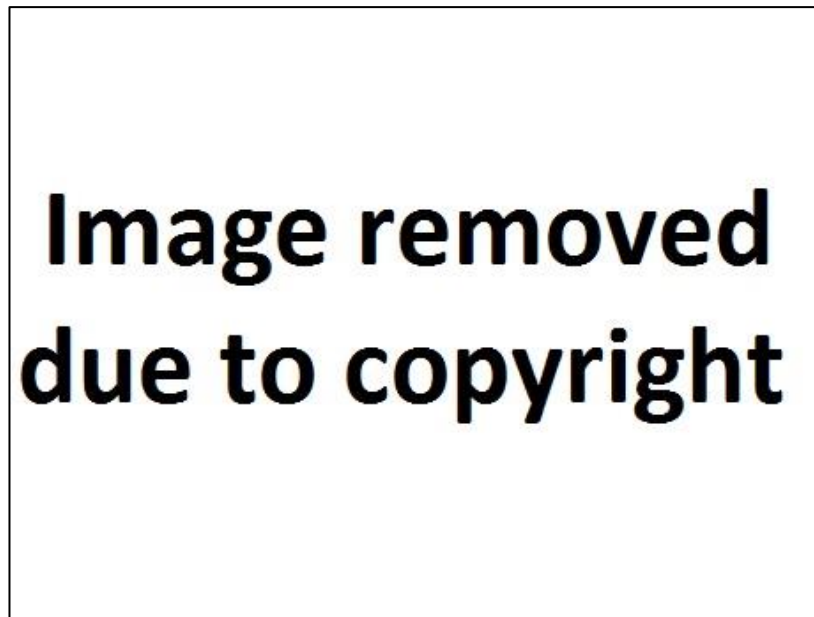


Figure 5.4. Screen shot from Living Life to the Full Interactive, from which it is evident that the program possesses the minimal social cue of voice output which accompanies the video clip.

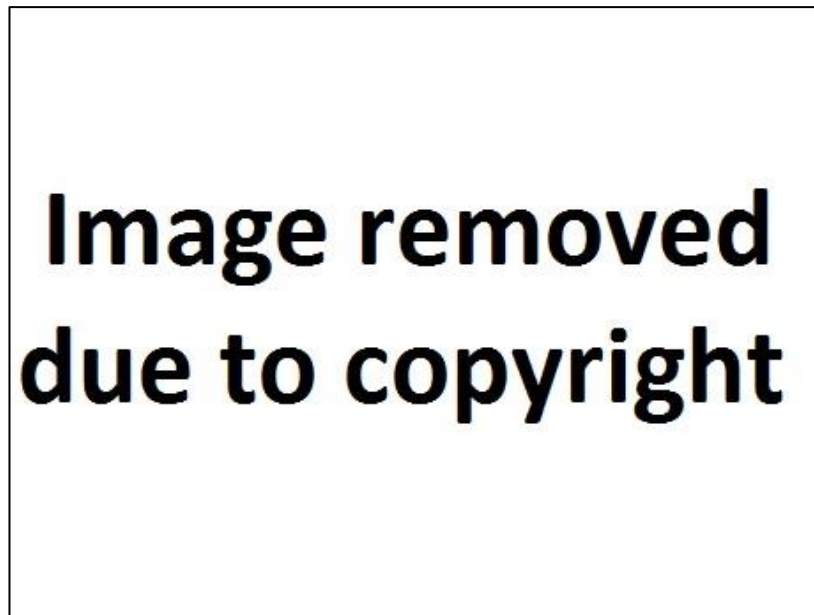


Figure 5.5. Screenshot of FearFighter™, an online CCBT package for the treatment of panic and phobias. This screen demonstrates how CCBT programs include the minimal social cue of “interactivity” by providing text output as well as text input from the program user.

Evidence from qualitative studies demonstrate how people can experience CCBT programs as social agents and apply certain expectancies to the program. For example, some participants have reported feeling like the computer cared for them; “I felt like the computer cared, and I know that sounds absolutely ridiculous” (Knowles et al., 2012). Others have reported thinking of themselves and the computer in a collaborative partnership; “Every week I thought it was exciting: like “what are *we* going to do now” (Gerhards et al., 2010). CCBT users may also use personal identifiers when referring to CCBT programs; “You can sort of say what you want without being judged ... it’s just you and the computer ... *just the two of you* ...” (Gega, Smith & Reynolds, 2013). Conversely, some CCBT users reported applying social expectancies to programs which have not been met e.g. expecting the program to be sensitive to their needs and feeling frustrated when this has not happened (Hind et al., 2010).

Experimental investigations into HCI in CCBT and the exploitation of HCI principles in CCBT design remain untapped. Only a handful of researchers (Doherty et al., 2010; Doherty et al., 2012; Knowles et al., 2014) have expressed the importance of considering HCI in designing and disseminating e – mental health applications, despite the fact that human – computer interaction essentially replaces human – human interaction as a mechanism for building an engagement akin to a therapeutic relationship.

Aims and Justification

At present there are no published studies investigating how individual differences in client attachment styles may be associated with differences in the therapeutic alliance and engagement in guided and unguided CCBT. Given the evidence suggesting an association between adult attachment styles and these variables in face to face therapy, adult attachment styles should also colour the manner in which the therapeutic process is approached in CCBT. Such evidence has important implications for both the delivery of guided CCBT in primary care and the broad dissemination of unguided online CCBT programs. One major barrier to CCBT dissemination is the criticism that these programs fail to provide a therapeutic relationship (Helgadóttir et al., 2009). The partial or complete removal of a human therapist has resulted in concerns that common factors are missing in CCBT and that this will ultimately be a detriment to its effectiveness and patient safety (Whitfield & Williams, 2004). However, there is no published evidence that CCBT is harmful to clients or to the effectiveness of CBT (Anderson et al., 2004). Therefore, these common factors must either still be evident in CCBT or they have much less importance than in traditional therapies. As secure attachment styles are associated with greater commitment to traditional therapies (Dozier, 1990) exploring the relationship between attachment and engagement is also of

benefit. Attrition has been described as a fundamental characteristic of e – health interventions (Eysenbach, 2005), therefore identifying who is likely to engage with CCBT and who may require further support would be beneficial. In order to investigate if and how individual differences in adult attachment styles are associated with experience and engagement with CCBT in vivo, two studies were conducted mirroring differing levels of support.

Guided CCBT and unguided CCBT differ in two critical ways; the mode of access and the configuration of entities (computerised or human) which are part of the therapeutic alliance. Concerning treatment access, guided CCBT programs are accessed primarily through contact with health professionals. Consequentially these individuals must have made contact with a health professional and, having already sought help, have been ‘prescribed’ access to a guided CCBT program. In such a context the individual will have felt compelled and comfortable enough to seek help from a health professional and will possess a number of different expectations regarding guided CCBT as a form of treatment. Regarding the therapeutic alliance, guided CCBT programs are predominantly accessed with brief, human support. As such the relationship between the user and the program supporter and their expectations about the program and each other, are likely to impact engagement and outcomes (Cavanagh & Millings, 2013a).

In contrast, unguided CCBT is primarily accessed online. Unguided CCBT programs act as fully automated CBT interventions in which users create an account and ‘log on’ to access the CBT material. Unguided CCBT does not require the user to seek help from a health professional face to face in order access the CBT skills and

techniques the program has to offer²¹. This way of accessing CBT may be particularly appealing to individuals who typically avoid seeking help from people face to face. People may feel embarrassed or stigmatised about their mental illness and characteristics of the disorders themselves (such as social anxiety disorder) may mean the anonymity that unguided CCBT affords is particularly appealing. By virtue of the way unguided CCBT is accessed, such a context may engender a different set of expectancies than guided CCBT.

5.2. Study 2a: Guided CCBT

This study aims to explore the relationship between attachment, the therapeutic alliance and engagement in a context which mirrored predominantly self – help therapies (Newman et al., 2011). This study will use Beating the Blues (BTB) as a guided CCBT program. Beating the Blues is a CBT based treatment package for individuals with anxiety and/or depression and is delivered as a low intensity intervention in the stepped model. BTB is available “on prescription” and staff contact consists of introducing the program, brief monitoring, being available for consultation and for technical assistance (NICE, 2009a). Access to BTB is therefore gained through a GP or mental health professional, who then monitors and supports patient progress. In this study, the first session of the program will be delivered in a computer room under the supervision of the investigator who explained the program and was available for assistance if needed.

²¹ Importantly, although these CCBT programs offer users’ free access to CBT without the need to contact a health professional, these websites typically advise users to seek immediate help from professionals if feeling suicidal or need immediate treatment. Websites like Living Life to The Full and MoodGYM still advise their users that their programs are not intended as substitutes for seeking diagnosis and treatment from a health professional. However, whether or not program users heed this advice is unknown.

Hypothesis

As individual differences in attachment styles are associated with outcomes and engagement in face to face therapy, so too are they expected to be associated with outcomes and engagement with CCBT (Cavanagh & Millings, 2013a). If this is the case, measures of adult attachment styles should reliably predict scores on measures of therapeutic alliance and engagement when measured in vivo. This study is the first to explore the relationship between adult attachment styles and experience of guided CCBT. Therefore predictions based on previous research in the field of CCBT are not afforded. Based on the evidence from traditional face to face therapies, the following hypothesis may be formulated: Attachment security (i.e. low anxiety and avoidance) should be positively associated with measures of the therapeutic alliance and program engagement when measured during a lab based session designed to mimic the features of an initial CCBT treatment appointment.

5.2.1. Method

Participants.

One hundred and forty nine participants were recruited online using the University of Sussex participant recruitment system (SONA). Baseline data showed the age of the sample ranged from 18 to 50 years ($M = 22.85$, $S.D = 5.18$) and consisted of 24 male (16.1%) and 125 females (83.9%). Participants were all students at the University of Sussex who took part in return for course credits. The study received ethical approval from the Cross-Schools Research Ethics Committee (C-REC) of the University of Sussex prior to commencement of the study.

Measures.

Patient health questionnaire – 9 (PHQ – 9; Spitzer, Kroenke & Williams, 1999). The patient health questionnaire is a nine item self – report measure designed to assess depressive symptomology. The nine items constituting the scale are designed to correspond to the diagnostic criteria for major depression outlined in the DSM (DSM – 5; APA, 2013). Respondents are asked to report how often they experience each of the nine symptoms ranging from 0 (not at all) to 3 (nearly every day). Total scores can range from 0 – 27 and can be used to classify individuals into categories of symptom severity; minimal (1 – 4), mild (5 – 9), moderate (10 – 14), moderately severe (15 – 19) and severe (20 – 27). Investigation into the psychometric properties of the PHQ – 9 has illustrated the scale has high internal consistency at baseline and post – treatment, $\alpha = .83$ and $\alpha = .92$ respectively (Cameron, Crawford, Lawton & Reid, 2008). In the present sample, the PHQ – 9 demonstrated good internal consistency, $\alpha = .86$

Generalized anxiety disorder – 7 (GAD – 7; Spitzer, Kroenke, Williams & Lowe, 2006). The GAD scale is a brief self-report scale designed to identify likely cases of generalised anxiety disorder. Items on the GAD – 7 correspond to GAD symptom criteria defined by the DSM – IV. Respondents report how frequently they have experienced these seven GAD symptoms over the past two weeks, ranging from 0 (not at all) to 3 (nearly every day). Total scores can range from 0 – 21 and can be used to classify individuals into categories of symptom severity; normal (0 – 4), mild (5 – 9), moderate (10 – 14) and severe (15 – 21). At a threshold score of 10, the GAD – 7 has a sensitivity of 89% and a specificity of 82% for generalised anxiety disorder, demonstrating good criterion validity. Investigation into the psychometric properties of the GAD – 7 has demonstrated the scale has good internal consistency; $\alpha = .91$ (Dear et

al., 2011). In the present study, the GAD – 7 also demonstrated good internal consistency, $\alpha = .88$.

Experiences in close relationships scale (ECR; Brennan, Clark & Shaver, 1998, Rowe & Carnelley, 2003). The ECR is a 36 item self – report measure of adult attachment and was adapted for use in this study as reported in Study 1. For the present sample the ECR – A demonstrated good internal consistency with $\alpha = .84$ for the anxiety subscale and $\alpha = .88$ for the avoidance subscale.

Client attachment to therapist scale, secure subscale – adapted (CATS – SA; Mallinckrodt, Gantt & Coble, 1995). The original 36 item scale is an instrument measuring and the style of attachment that develops towards the therapist from an attachment theory perspective. The CATS has three subscales; *Secure*, *Avoidant – Fearful and Preoccupied – Merger*. Items are scored on a six point scale ranging from 1 (strongly disagree) to 6 (strongly agree). For use in this study, the wording of the CATS was modified to read CCBT, instead of counsellor and only the secure subscale was used. This was because only items on the secure subscale could be adapted to make conceptual sense and evidence suggests the CATS Secure subscale is the most consistently related to the alliance (Bachelor et al., 2010). As such the CATS Secure subscale as used in this study consisted of 13 items, with only one item needing to be removed. For the original CATS Secure subscale Mallinckrodt et al. (1995) report an adequate internal consistency of $\alpha = .64$. In the present sample, reliability was adequate, $\alpha = .77$.

Working alliance inventory – short form - adapted (WAI – SA; Horvath & Greenberg, 1989, Tracey & Kokotovic, 1989). The Working Alliance Inventory – Short Form is a 12 item scale which measures the quality of the working alliance between a client and therapist. The WAI was developed to assess the alliance in relation

to Bordin's (1980) tripartite model. Items on the WAI asks respondents to rate much they feel certain things (relating to task, goals and bonds) about their therapist. Responses are given on a seven point scale ranging from 1 (never) to 7 (always). The WAI – S was modified for use in the current study to read 'the program' instead of the respondent entering their counsellor's name. Higher scores signify a stronger working alliance with the program. Tracey and Kokotovic (1989) report the WAI – Short Form (client version) has good internal consistency for the WAI subscales and global score: $\alpha = .90$ (task), $\alpha = .92$ (bond), $\alpha = .90$ (goal) and $\alpha = .98$ (global). In the present study the WAI – SA demonstrated good internal consistency on all three subscales and the global score; $\alpha = .78$ (task), $\alpha = .79$ (bond), $\alpha = .88$ (goal) and $\alpha = .91$ (global).

The User Engagement Scale – adapted (O'Brien & Toms, 2010). The User Engagement Scale is a 31 item self-report questionnaire designed to measure user engagement with interactive, online systems. Based on the process based model on engagement, the UES is a multidimensional scale measuring six different aspects of the construct of engagement with technology. These six aspects (subscales) include; Perceived Usability, Aesthetics, Focused Attention, Felt Involvement, Novelty, and Endurability. All subscales have good internal consistency (α 's range from .62 to .89 in O'Brien and Toms original sample). Participants rate on a scale ranging from 1 (strongly disagree) to 5 (strongly agree) how much they agree with each statement designed to assess each construct. The maximum score achievable is 155, with higher scores reflecting more engagement with the program. As the original UES was used to assess engagement with an online shopping website, the wording of the UES was modified for use in the present study, e.g. item one "I lost myself in this shopping experience" became "I lost myself in this CCBT program". Internal consistency was excellent for the present sample with a global UES – A reliability of $\alpha = .95$.

Materials

Beating the Blues ® Beating the Blues ® is a CCBT package designed to target depression and anxiety. The treatment package consists of eight, 50 minute sessions designed to be completed weekly with CBT homework in between sessions. Beating the Blues was written and developed by Professor Judy Proudfoot and Ultrasis plc. Participants in this study completed session one of the program. Session one aims to help the program user identify and establish a picture of their problems and their causes. It also aims to describe how anxiety and depression are developed and maintained, for example by describing how what we do impacts the way we feel (see Figure 5.6). The session also presents a homework task in which the user should do a pleasurable event and then record how it makes them feel. The program is interactive so that the user can click options (such as asking the program to provide examples of pleasurable events; see Figure 5.7) or typing in text. Five video case studies are also introduced in which people describe their own struggle with depression and anxiety (Figure 5.8). Beating the Blues ® was chosen for use in this study as it is an example of a practitioner guided CCBT intervention intended for use in the IAPT stepped model of care (NICE, 2006). Furthermore, Beating the Blues ® was originally the only CCBT intervention recommended for treating depression and anxiety in primary care by NICE (2006). Therefore Beating the Blues ® represents an evidence – based, NICE approved guided CCBT program delivered in the IAPT framework. Access to Beating the Blues ® is gained through referral by general practitioners. These features of program access and guidance are intended to be reflected in the procedure for this study.



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Figure 5.6. Screenshot of Beating the Blues ® session one which provides psychoeducational material describing how our behaviours (activities), thoughts and feelings are linked.



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Figure 5.7. The program user can click to view suggestions for pleasurable activities.

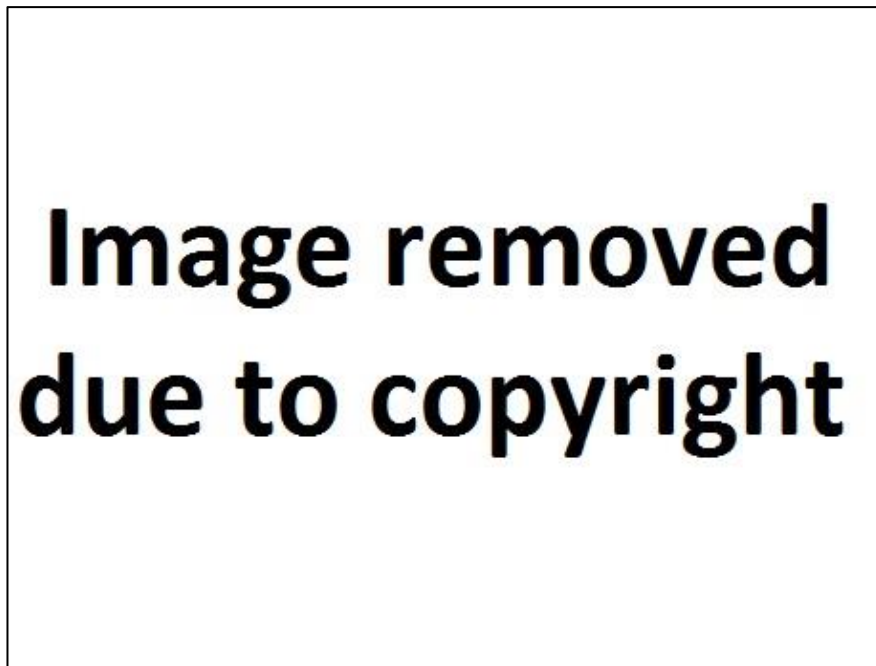


Figure 5.8. A screenshot from Beating the Blues ® in which Andrew talks about his struggle with depression.

Procedure.

Participants were recruited through an online participant recruitment system and received course credits for participation. The study took place in a computer lab at the university campus and each session lasted approximately 1 hour. Participants were run in large groups working individually at a computer. Three investigators ran participants in this study, primary investigator (R.G), a second investigator who was a MSc. student (J.N.P) and another MSc. student (L.F) who ran participants for course credit. J.N.P had begun this study as part of their MSc. research project with input from R.G and K.C (principle investigator/supervisor)²². A diagrammatical representation of the study procedure is provided in Figure 5.9. Participants were introduced to the session by the investigator and asked to work in silence. The session began with participants answering the following questionnaires administered using the Bristol Online Survey

²² I contributed to the design of the study and collaborated with J.N.P making decisions on which measures to include. J.N.P ran the first 64 participants and I ran the remaining 86. All analysis and write-up as presented was completed by R.G.

system: demographic information, the ECR – A, the PHQ – 9 and the GAD – 7.

Individual log in codes were given to participants to complete session one of Beating the Blues. If any participants were had questions or computer issues they were instructed to ask the investigator to help them. After session one had been completed, participants then returned to Bristol Online Survey to complete post – session questionnaires. These included the WAI – SA and the UES – A. The dependent variables were deemed to be adequate measures of sustained engagement even though participants only took part in one session of CCBT. This is because early alliance and early engagement are predictive of later sustained treatment engagement and drop out tends to occur in the early stages of therapy (Horvath & Symonds, 1991; Bados et al., 2007). The procedure ended with a full debriefing and written information on where to access local mental health services if required. Participants were informed of the purpose and nature of the study. Participants did not receive monetary payment for their participation but did receive course credits.

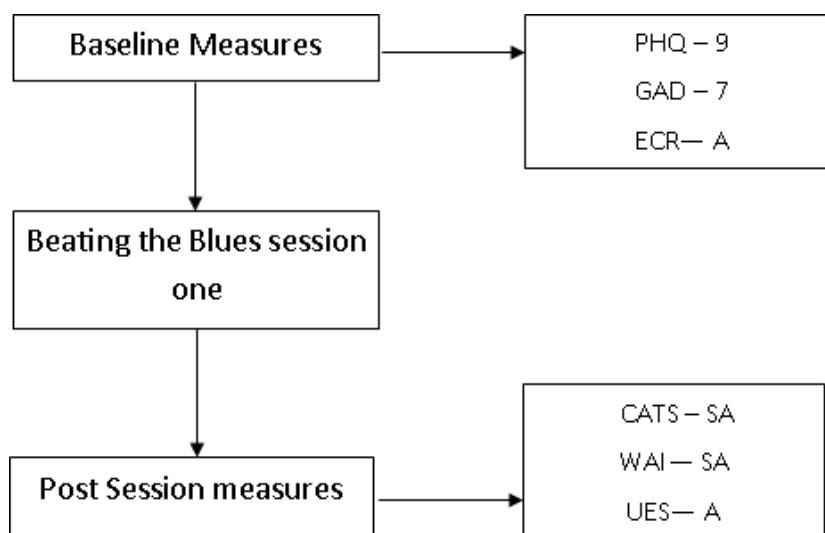


Figure 5.9. Diagram of the general procedure for Study 2a including baseline and post session measures.

5.2.2. Results

Data Screening and Descriptive statistics

Baseline data was screened to ensure the sample met the necessary assumptions of parametric data (Field, 2013). Screening of boxplots illustrated no extreme outliers in the data and histograms and analysis of skew and kurtosis revealed overall a fairly normal distribution for the main outcomes. Assumptions of each analysis were judged in turn and any issues reported where appropriate. In order to reduce any bias in the data, robust methods were employed. As such, bias corrected accelerated bootstrapped confidence intervals, based on 1000 bootstrapped samples are implemented and reported throughout in square brackets. Demographic variables measured as baseline are reported in Table 5.2.

Table 5.2: Table describing the characteristics of the study participants (N = 149).

Demographic Variable	N (%)
Age (M, S.D)	22.85 (5.18)
Gender	
Male	24 (16.1%)
Female	125 (83.9 %)
PHQ – 9 (M, S.D)	6.28 (4.94)
PHQ – 9 Severity Category	
Normal	67 (45.0%)
Mild	51 (34.2%)
Moderate	19 (12.8%)
Moderately Severe	9 (6.0%)
Severe	3 (2.0%)
GAD – 7 (M, S.D)	6.36 (4.74)
GAD – 7 Severity Category	
Normal	70 (47.0%)
Mild	41 (27.5%)
Moderate	29 (19.5%)
Severe	9 (6.0%)

Data in context

All averages and t – tests are reported in Table 5.3. Average participant ratings on the CATS – SA were 40 out of a maximum 66 ($M = 40.30$, $S.D = 9.72$). A one sample t – test showed average CATS – SA ratings were significantly above the neutral midpoint, $t(148) = 10.94$, $p < .001$, mean difference, 8.80 [7.09, 10.26]. This indicates participants felt a ‘secure’ attachment with the program.

The mean WAI – SA score for the sample was 30 ($M = 30.31$, $S.D = 8.10$) and a one sample t – test showed this average was significantly different from the neutral midpoint, $t(148) = -2.07$, $p = .04$, mean difference, -1.53 [-2.99, -0.07]. This suggests the perceived working alliance between participants and Beating the Blues was poor. Mean WAI – SA task subscale scores were around 13 out of a possible 21 ($M = 12.87$, $S.D = 3.82$) and this mean was significantly higher than the neutral midpoint for the subscale; $t(148) = 2.79$, $p = .01$, mean difference, 0.87, [0.29, 1.49]. Mean WAI – SA bond subscale scores were around 12 out of a possible 21 ($M = 12.19$, $S.D = 4.43$) and this mean was not significantly different than the neutral midpoint for the subscale; $t(148) = .53$, $p = .59$, mean difference, .19 [-0.44, 0.82]. Average scores on the WAI – SA goal subscale were around nine out of a possible 14 ($M = 9.19$, $S.D = 2.93$) and this mean was significantly higher than the neutral midpoint for the scale; $t(148) = 4.94$, $p < .001$, mean difference, 1.18 [0.72, 1.65].

Average engagement with the Beating the Blues session was good, with a mean engagement rating of 98 out of a maximum 155 ($M = 98.08$, $S.D = 21.82$). This average engagement was significantly higher than the neutral midpoint for this scale; $t(142) = 2.79$, $p = .01$, mean difference, 5.08 [1.36, 8.60]. This suggests engagement with the first Beating the Blues session was significantly better than neutral.

Table 5.3: Descriptive statistics for each main variable of analysis and results of t – tests determining whether mean responses were higher or lower than the scale midpoint.

Measure	Minimum	Maximum	M	$S.E$	$S.D$	t – test
CATS – SA	11	66	40.30	0.81	9.72	$t(148) = 10.94^{***}$
WAI – SA	8	56	30.31	0.75	8.10	$t(148) = -2.07^{**}$
UES – A	31	155	98.08	1.83	21.82	$t(142) = 2.79^{**}$

Note: Minimum and Maximum refer to the possible lowest and highest scores for each scale. ,

*** $p < .001$, ** $p < .05$.

Program specific attachment

A hierarchical multiple regression analysis with CATS – SA as the outcome variable resulted in the following. In Step 1 there existed a multiple correlation between attachment anxiety, attachment avoidance and CATS – SA scores of $R = .15$ and accounted for 2.1% of the variance in CATS – SA scores ($R^2 = .021$). Step 1 did not significantly predict scores on the CATS -SA, $F(2, 146) = 1.57, p = .21$. Including the interaction term in Step 2 increased the variance accounted for to 2.3% ($R^2 = .023, R^2_{\text{change}} = .002$). However, Step 2 did not significantly improve the ability to predict scores on the CATS - SA, $F(3, 145) = 1.15, p = .33$. Subsequently, final model parameters also showed none of the variables significantly contributed the model. For attachment anxiety $\beta = .09 [-0.66, 2.08], t(145) = .105, p = .30$, for attachment avoidance, $\beta = -.14 [-2.66, 0.16], t(145) = -1.67, p = .09$ and for the attachment interaction term $\beta = -.05 [-1.74, 0.93], t(145) = -.58, p = .56$. Model parameters are reported in Table 5.4. It appears there are no associations between dispositional attachment and how securely participants attached to the program.

Working alliance.

A hierarchical multiple regression analysis was conducted with WAI – SA as the outcome variable. For Step 1 in which attachment anxiety and avoidance were entered, there existed a multiple correlation with WAI – SA scores of $R = .10$ and accounted for 1.1% of the variance in the outcome ($R^2 = .011$). Step 1 did not significantly predict scores on the WAI – SA, $F(2, 146) = .80, p = .45$. Including the attachment interaction term in step two increased the amount of variation accounted for to only 1.5% ($R = .015, R^2 \text{ change} = .004$). Step 2 also did not significantly improve ability to predict WAI – SA scores, $F(3, 145) = .72, p = .54$. Model parameters (see Table 5.5) for the final model show none of the attachment variables significantly contributed to the model. For attachment anxiety, $\beta = .05 [-0.81, 1.66], t(145) = .61, p = .54$ and for attachment avoidance $\beta = -.11 [-1.99, 0.18], t(145) = -1.29, p = .20$. There was also no significant interaction effect: $\beta = -.06 [-1.63, 0.85], t(145) = -.76, p = .45$. There are no significant associations between dispositional attachment and working alliance. As such WAI – SA subscales were not explored further.

User engagement

Hierarchical multiple regression analysis showed a multiple correlation of $R = .10$ between attachment anxiety, avoidance and UES – A scores. Step 1 accounted for 0.9% of the variance ($R^2 = .009$) in user engagement and did not significantly predict scores on the UES: $F(2, 140) = .63, p = .53$. The inclusion of the interaction term in Step 2, did not change the amount of variance accounted for ($R^2 = .009, R^2 \text{ change} = .000$) and UES – A scores were still not significantly predicted from the attachment variables, $F(3, 139) = .44, p = .72$. Again, none of the attachment variables significantly contributed to the final model. For attachment anxiety, $\beta = .09 [-1.44, 5.08], t(139) = 1.01, p = .31$ and for attachment avoidance $\beta = -.06 [-4.14, 1.49], t(139) = -.70, p = .49$.

There was no significant interaction effect, $\beta = .02 [-2.32, 3.22]$, $t(139) = .26$, $p = .80$.

See Table 5.6 for all model parameters. Dispositional attachment style does not appear to be associated with engagement with guided CCBT.

Table 5.4: Linear model of attachment as predictors of CATS – SA scores with 95% bias corrected and accelerated confidence intervals reported in the parentheses.

Confidence intervals and standard errors based on 1000 bootstrap samples.

	<i>b</i>	SE β	β	<i>p</i>
Step 1				
Constant	40.30 (38.77, 41.75)	0.80		$p < .001$
Anxiety	0.83 (-0.65, 2.20)	0.75	.09	$p = .270$
Avoidance	-1.15 (-2.59, 0.19)	0.71	-.14	$p = .109$
Step 2				
Constant	40.41 (38.82, 41.90)	0.83		$p < .001$
Anxiety	0.79 (-0.66, 2.08)	0.75	.09	$p = .298$
Avoidance	-1.20 (-2.66, 0.16)	0.72	-.14	$p = .097$
Interaction	-0.36 (-1.74, 0.93)	0.62	-.05	$p = .562$

Note $R^2 = .021$ for Step 1; $\Delta R^2 = .002$ for Step 2.

Table 5.5: Linear model of attachment as predictors of WAI – SA scores with 95% bias corrected and accelerated confidence intervals reported in the parentheses. Confidence intervals and standard errors based on 1000 bootstrap samples.

	<i>b</i>	SE β	β	<i>p</i>
Step 1				
Constant	30.47 (28.99, 31.93)	0.74		$p < .001$
Anxiety	0.48 (-0.82, 1.82)	0.69	.06	$p = .492$
Avoidance	-0.79 (-1.88, 0.32)	0.66	-.10	$p = .232$
Step 2				
Constant	30.61 (29.13, 32.03)	0.76		$p < .001$
Anxiety	0.43 (-0.82, 1.67)	0.70	.05	$p = .541$
Avoidance	-0.86 (-1.99, 0.18)	0.66	-.11	$p = .199$
Interaction	-0.43 (-1.63, 0.85)	0.60	.06	$p = .447$

Note $R^2 = .011$ for Step 1; $\Delta R^2 = .004$ for Step 2.

Table 5.6: Linear model of attachment as predictors of UES – A scores with 95% bias corrected and accelerated confidence intervals reported in the parentheses. Confidence intervals and standard errors based on 1000 bootstrap samples.

	<i>b</i>	SE β	β	<i>p</i>
Step 1				
Constant	98.08 (94.76,101.21)	1.83		$p<.001$
Anxiety	1.69 (-1.44, 5.03)	1.69	.09	$p=.320$
Avoidance	-1.20 (-4.34, 1.71)	1.62	-.06	$p=.462$
Step 2				
Constant	97.97 (94.69,100.08)	1.89		$p<.001$
Anxiety	1.73 (-1.44, 5.08)	1.70	.09	$p=.312$
Avoidance	-1.14 (-4.14, 1.49)	1.64	-.06	$p=.486$
Interaction	0.36 (-2.32, 3.22)	1.39	.02	$p=.797$

Note $R^2 = .009$ for Step 1; $\Delta R^2 = .066$ for Step 2.

5.2.3. Discussion

This study aimed to explore whether the adult attachment styles were associated with experience and engagement with a guided CCBT program in vivo. Neither attachment anxiety nor attachment avoidance significantly predicted the program specific attachment (CATS – SA), the quality of the working alliance (WAI – SA) or engagement with the program (UES – A). As such, attachment appeared to hold no significant association with guided CCBT in vivo.

Attachment and experience of CCBT

Dispositional adult attachment styles did not significantly predict scores on the CATS – SA. Specifically, attachment did not predict how secure participants felt in their attachment toward the program. The CATS secure subscale assesses the degree to which clients perceive their therapist (in this case the CCBT program) as responsive and available (Bachelor et al., 2010). It was hypothesised that chronic secure attachment style would be positively associated with scores on the CATS – SA, in that people scoring high on attachment security would also score highly on the CATS – SA. This was however, not supported by the results of this study.

The results demonstrated no significant association between attachment and the quality of the therapeutic alliance in guided CCBT. This would suggest that for guided CCBT, adult attachment patterns hold no significant influence on the quality of the therapeutic alliance. This finding is contrary to the study hypothesis which posited a relationship would exist between attachment styles and the therapeutic alliance, and that this relationship would mirror the relationship evident between these variables in face to face psychotherapy. It was hypothesised that as attachment insecurity increased, scores on the therapeutic alliance would decrease. Evidence from traditional therapy literature demonstrates a clear association between adult attachment patterns and the therapeutic alliance. Researchers have proposed that insecure attachment styles impede the formation of a therapeutic alliance (Eagle & Wolitzky, 2009) and meta-analysis have concluded secure attachment is positively associated with the therapeutic alliance, whereas high attachment anxiety and avoidance is negatively associated with the alliance (Bernecker, Levy & Ellison, 2014; Diener & Monroe, 2011).

Explanations for the failure to find these associations in CCBT vary. Scores on the WAI were typically neutral. Overall, this may imply that participants did not

develop a good therapeutic alliance with the program. Possibly the core features of the therapeutic alliance were not effectively translated or the alliance was not well established as participants only completed one session. As such, floor effects and a Type II error may account for this finding. Alternatively, it is possible that for the study participants, the context of the study was such that the attachment system was not sufficiently activated for internal working models to exert their influence on the therapeutic relationship.

Attachment and engagement with guided CCBT

Results also showed no significant association between dispositional adult attachment and engagement with guided CCBT. This meant that engagement with the program did not vary according to attachment anxiety and avoidance dimensions. This finding is contrary to the study hypothesis which proposed higher attachment insecurity would be associated with lower program engagement. It also runs contrary to the traditional psychotherapy literature which demonstrates those with higher attachment security tend to make better use of therapy and engage more readily with aspects of therapy, including the therapeutic relationship, compared to those low on attachment security (Bachelor et al., 2010; Daniel, 2006). The results of this study suggest this may not be the case for guided CCBT. On average the sample reported engaging with the program at a level that was significantly higher than the neutral midpoint. Given Beating the Blues has been evidenced to incorporate features of the therapeutic alliance which would promote felt security, such as empathy and unconditional acceptance (Barazzzone et al., 2012) it is plausible that the program did well enough at promoting a sense of security that dispositional attachment styles were overridden and their influence diminished.

Conclusions

This study aimed to explore the relationship between dispositional attachment patterns, the therapeutic alliance and engagement with guided CCBT. Based on a sample of 149 participants, results indicated no significant association between dispositional adult attachment patterns and the therapeutic alliance or engagement in guided CCBT. These results would suggest there is no significant relationship between dispositional attachment styles, the therapeutic alliance and engagement with guided CCBT. However, further research is required to investigate whether this is replicated in the context of unguided CCBT with no human support.

5.3. Study 2b: Unguided CCBT

Where the results from Study 2a provide an overview of the relationship between adult attachment and guided CCBT (or lack thereof) it cannot simply be assumed that these results translate to an unguided context in which there is no human interaction. Such an assumption would be an oversimplification. This study aims to explore the relationship between attachment, the therapeutic alliance and engagement in a context which mirrored ‘self – administered’ therapy (Newman et al., 2011).

Adult attachment and unguided CCBT.

In consideration of the results of Study 2a in which the adult attachment system did not appear to bear any significant influence on users’ experience of a guided CCBT program, the following difference between the role of the adult attachment system on guided and unguided CCBT is proposed and is based on individual differences in illness behaviour. Attachment has been highlighted as a critical psychological antecedent to the formation of the therapeutic alliance, with insecure attachment impeding the quality of said relationship (Bennett, Fuertes, Keitel & Phillips, 2011). When faced with

psychological distress, highly secure individuals possess an expectation that health professionals can be trusted in times of distress and their help will be acceptable (Hunter & Maunder, 2001). I propose the partial or complete absence of therapeutic support in CCBT should not cause alarm to the highly secure individual, who, with a positive view of the self and others has faith in their abilities to self – manage their therapeutic process and comfortably seek support from close others if necessary. Such persons may be able to place their trust in a CCBT program and feel hopeful the benefits of a CCBT program offered from a good clinical provenance.

Individuals high on attachment anxiety and low on attachment avoidance (preoccupied) have little faith in their ability to cope with their distress (Hunter & Maunder, 2001). Their internal working models drive these individuals to constantly seek reassurance and proximity from health professionals (who act as anxiety regulators) while simultaneously finding their help insufficient. Individuals high on anxiety and avoidance (fearful – avoidant) possess an internal working model which is inadequately organised to provide a reliable strategy for dealing with distress. These individuals want health professionals to provide reliable and responsive care, but have no faith that they will (Hunter & Maunder, 2001). Based on this theoretical account I propose that the complete absence of human therapeutic support acts as a contextual threat trigger for the activation of the adult attachment system. Both preoccupied and fearful - avoidant individuals possess a desire to seek reassurance from another human being and both have little belief in their abilities to self – manage their therapeutic process.

For individuals low on attachment anxiety and high on attachment avoidance, unguided CCBT may be an attractive treatment option. The internal working models of dismissing – avoidant individuals dictates that others are unreliable and they are better off being self – reliant. This may make the idea of self – managing the therapeutic

process very attractive as there is no need to place any dependence on anyone else. However, the other aspects of highly avoidant individuals, such as a reluctance to acknowledge personal distress and less emotional commitment to therapy (Dozier, 1990) may subsequently impede the formation of a therapeutic alliance in unguided CCBT.

How would these patterns manifest in different CCBT contexts? In guided CCBT there is still the presence of another human being, who provides (albeit brief) therapeutic support. The program itself still contains the automated alliance features which foster the alliance and the user interacts with the program as a social agent, however these human – computer interaction elements are afforded less cognitive attention because the human – human interaction is more salient. In contrast, human therapeutic support is absent in unguided CCBT. Currently, the technology being utilised in unguided CCBT means the program is not entirely analogous to a human attachment figure²³. Without the presence of human therapeutic support the program user relies entirely on human – computer interaction. I propose that it is this very absence of human support that acts as a contextual trigger of the adult attachment system, particularly for individuals high on attachment insecurity.

In the context of unguided CCBT, the program user applies social expectancies to the computer and therefore the program is treated like a social agent. In this respect, the program user places expectancies onto the program (like reacting sensitively to their situation) and the computer essentially provides all the functions that a human therapist would. Simultaneously, the highly insecure program user is consciously hyper – aware of the absence of a human therapist, which in turn triggers the activation of the adult attachment system. In this instance the relational aspects of the human – computer interaction are the only processes available for the attachment system to exert its

²³ That is not to say they won't be in the future, with the promising implications of virtual agents (e.g. Bickmore & Gruber, 2010).

influence on. Given the program is treated as a social agent, and the alliance features emulate those experienced in traditional therapy, the adult attachment system proceeds to exert its influence as it would in face to face therapy. This model is outlined in Figure 5.10.

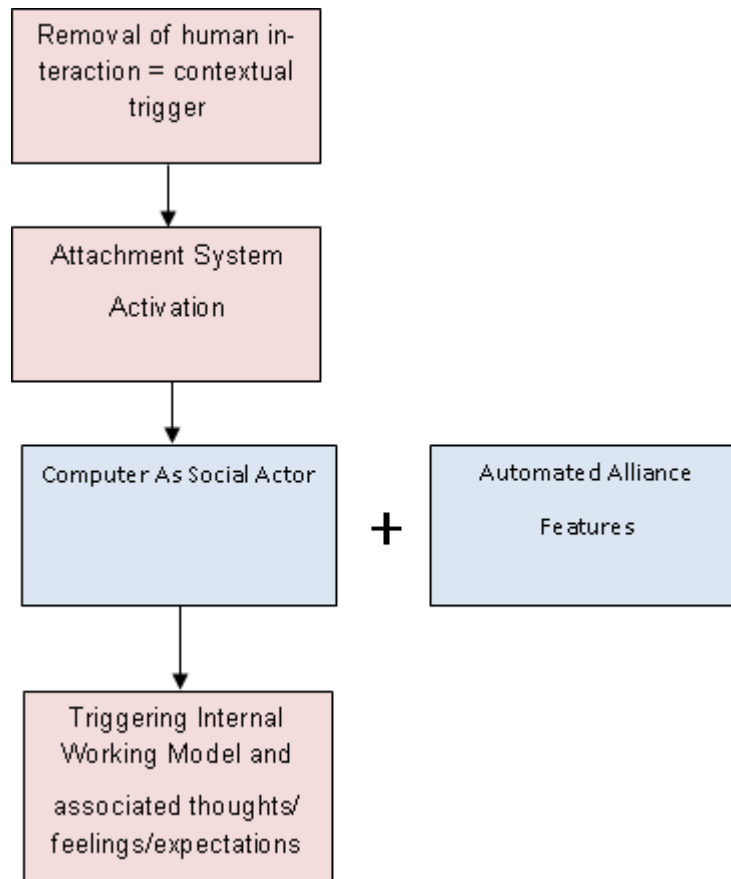


Figure 5.10. Proposed model of how the adult attachment system may influence engagement and the therapeutic alliance in CCBT for individuals high on attachment insecurity.

Justification and aims

The efficacy, accessibility and scalability of unguided CCBT means the potential public health impacts of these programs are considerable. The internet permits stand alone, unguided CCBT to be disseminated and accessed on an immense scale. Free, unguided internet based CCBT provides unlimited access to CBT for millions more individuals than guided CCBT programs, which in themselves are limited by the

availability of practitioners to provide guidance (Bennett – Levy et al., 2010). Where some evidence suggests the clinical effectiveness of unguided CCBT may be weaker than guided CCBT (Gellatly et al., 2007; Spek et al., 2007), other research suggests the clinical effectiveness of unguided CCBT to be comparatively good (Grist & Cavanagh, 2013; Haug, Nordgreen, Ost & Havik, 2012). Furthermore the research suggesting unguided programs have weaker clinical effectiveness may be explained by the high attrition rates these programs suffer. It is plausible that widespread, successful implementation of unguided CCBT being hampered by attrition rates which in turn impedes the therapeutic efficacy of these programs. It is imperative then that research efforts should explore ways to augment active engagement and therapeutic alliances with unguided CCBT programs. Target areas include the therapeutic alliance (WAI) and active engagement (UES).

Given that dispositional adult attachment styles are evidenced to be a particularly significant variable influencing engagement and the therapeutic alliance in face to face therapies (Dozier, 1990; Smith et al., 2010), this study aims to explore how adult attachment may influence these key variables in unguided, online CCBT. As such the study was designed to reflect a context which mirrored self – administered therapy (Newman et al., 2011). This study was conducted entirely online, with no direct human support provided. Recruitment, questionnaire administration and the CCBT program was online based, which did not involve any direct contact between the investigator and participants. The freely accessible online CBT program Living Life to the Full (LLTTF) was utilised in this study. Living Life to the Full is a CBT based life skills course written by a UK based psychiatrist (Professor Chris Williams). Registration for the program is free and is therefore available to anyone with internet access.

Study hypothesis

It is proposed that for unguided programs, the absence of human support acts as a contextual trigger of the adult attachment system, particularly for individuals high on attachment insecurity. Where highly secure program users will feel relatively comfortable working independently and self-managing their therapeutic process, people high on attachment insecurity will become hyper – aware of the absence of human support. This will increase the perceived level of threat, activate the internal working model and impede the ability to engage and build an alliance with the automated alliance features in CCBT as would happen in face to face therapy. It is therefore hypothesised that attachment security (low in attachment anxiety and attachment avoidance) will be positively associated with measures of the therapeutic alliance and program engagement, whereas attachment insecurity will be negatively associated with these outcomes. It is necessary to clarify that this study does not explicitly test the threat prime hypothesis, but does test whether relationships exist between adult attachment styles and experience of unguided CCBT. The threat prime hypothesis simply serves to explain why these relationships may exist with regard to unguided CCBT when they were not evident with regard to guided CCBT in the previous study.

5.3.1. Methods

Participants

One hundred and seventy five participants completed the study, 48 (27.4%) were male, 126 (72%) were female and one participant identified as transgender (0.6%). Ages ranged from 18 to 45 years ($M = 20.04$, $S.D = 3.37$). One hundred and forty two were of a White ethnicity (81.1%), 9 (5.1%) were of a Mixed ethnicity, 8 (4.6%) were of a Black or Black British ethnicity, 7 (4.0%) were of an Asian or Asian British ethnicity, 7

(4.0%) were of a Chinese ethnicity and 2 (1.1%) were other ethnicity. Thirteen (7.4%) were taking prescribed medication to treat anxiety or depression and 162 (92.6%) were not. Participants were all undergraduate students at the University of Sussex who took part in return for course credits. The study received ethical approval from the Cross-Schools Research Ethics Committee (C-REC) of the University of Sussex prior to commencement of the study.

Engagement and Attrition

One hundred and ninety seven people showed interest in taking part in this research by signing up via the SONA participant recruitment system for the University of Sussex. Of this original number, 175 people began the study (88.83 %). All participants who began the study completed pre CCBT and post CCBT measures, and so completed the entire study (100% adherence to research protocol).

Measures

The Experiences in Close Relationships Scale - Adapted (ECR – A; Brennan, Clark & Shaver, 1998; Rowe & Carnelley, 2003). As reported in Studies 1 and 2a and in previous research (e.g. Rowe & Carnelley, 2003) this scale assessed feelings about close relationships and not just romantic attachments. Internal consistency for the subscales was excellent in the present sample with $\alpha = .92$ for the anxiety subscale and $\alpha = .89$ for the avoidance subscale.

Patient Health Questionnaire for Depression and Anxiety 4 (PHQ – 4; Kroenke, Spitzer, Williams & Lowe, 2009). The PHQ – 4 is a brief, four item measure used as an anxiety and depression screening tool and was reported in Study 1. Reliability was generally good in this sample with the anxiety subscale demonstrating a good internal consistency of $\alpha = .79$ and the depression subscale demonstrating a good internal consistency of $\alpha = .80$. Reliability was good also for the whole scale; $\alpha = .85$.

Client Attachment to Therapist Scale - Secure subscale, adapted (CATS – SA; Mallinckrodt, Gantt & Coble, 1995). The Client Attachment to Therapist Scale (CATS) is a 36 item questionnaire developed to measure client reported attachment to their therapist. The CATS was adapted for use in this study as Study 2a. For the present sample, the CATS – SA demonstrated good internal consistency, $\alpha = .85$.

Working Alliance Inventory - Short form, adapted (WAI – SA; Horvath, 1981, 1982; Tracey & Kokotowitc 1989). The WAI is a self-report questionnaire developed to assess the working alliance construct (Bordin, 1979) and was reported in Study 2a. Reliability for the three subscales in the present sample were good as demonstrated; WAI – SA task subscale $\alpha = .83$, bond $\alpha = .83$ and goal $\alpha = .63$. Overall the WAI – SA displayed excellent reliability in the present sample; $\alpha = .91$ for the global scale.

The User Engagement Scale – adapted (UES – A; O’Brien & Toms, 2010). The User Engagement Scale is a 31 item self-report questionnaire designed to measure user engagement with technology as reported in Study 2a. For the present sample internal consistency was good. For Focused Attention $\alpha = .93$, for Felt Involvement $\alpha = .83$, for Novelty $\alpha = .92$, for Endurability $\alpha = .71$, for Aesthetics $\alpha = .93$ and for Perceived Usability $\alpha = .81$.

Materials.

Living Life to the full © (LLTF, www.lltf.com). Living Life to the full © is a free to access, self – help internet CBT program developed to tackle feelings of low mood, worry, stress and distress. LLTTF was developed by Professor Chris Williams, at the University of Glasgow. Participants were directed to the main LLTTF homepage and instructed to choose one of the five available sample sessions. These sessions

included; "Why do I feel so bad?", "How to fix almost anything", "10 things that make you feel happier straight away", "I can't be bothered doing anything", and "I'm not good enough". Participants were instructed to choose which ever session they preferred in order to maintain ecological validity and make the program session as relevant to the individual as possible. The program itself is a series of approximately 20 slides, which Professor Williams narrates. Downloadable hand-outs are also included as well as access to a moderated discussion forum where program users can share their experiences and support each other. Please see Figures 5.11, 5.12, and 5.32 for screenshots of different modules. Beating the Blues, the CCBT program used in Study 2a, was not appropriate for use in this study as it is a guided CCBT intervention. As this study aimed to mirror the real world use of unguided CCBT, LLTTF was a more suitable program as it is currently a widely used and endorsed unguided program (Gournay, 2006).

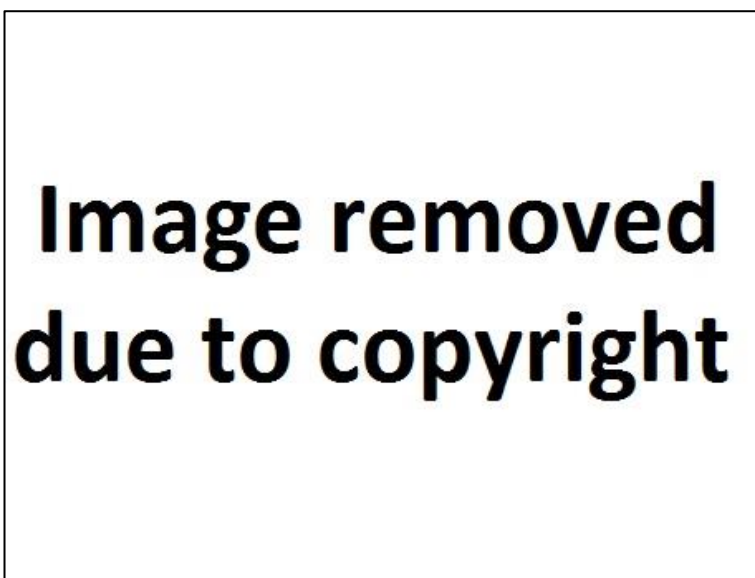


Figure 5.11. The LLTF main homepage where participants were directed to choose one module to complete.

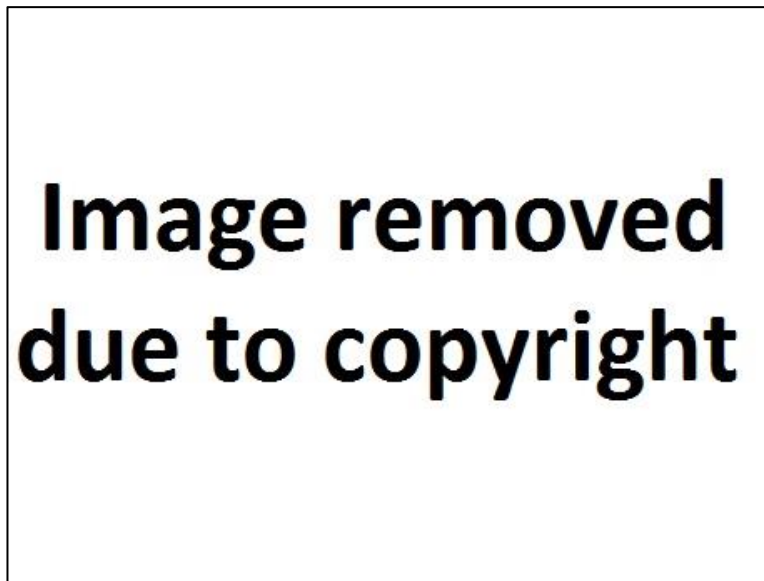


Figure 5.12. Screenshot of the module ‘Why do I feel So Bad?’ illustrating how the program provides a description of the cognitive behavioural model of low mood and the link between thoughts, feelings and behaviour.

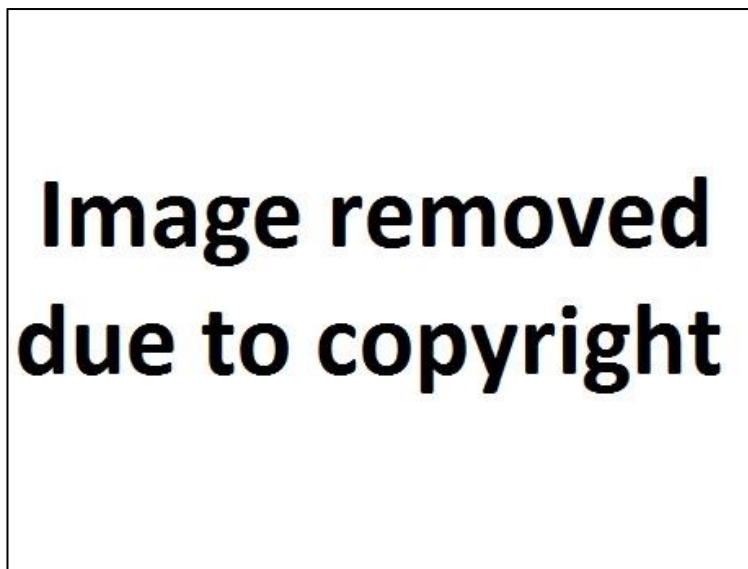


Figure 5.13. Screenshot of the module “10 Things To Do To Feel Happier” illustrating how the program introduces the user to behavioural exercises, such as listing happy memories. Also provided on this slide is a downloadable session hand-out in which users can complete this exercise.

Procedure

Participants were recruited via the SONA system and complete the study using Bristol Online Survey (BOS). Participants were asked to report demographic information and then presented with information detailing what CCBT is. Next participants completed the ECR – A and the PHQ – 4. Next an instruction page directed participants to view a public, free to access taster session of Living Life To The Full. Embedded in the BOS survey was a link to the Living Life to the Full website, which opened the homepage in a new tab of the respondents' internet browser. Participants were instructed to view one free session of their choice. Participants were permitted free choice as a matter of ecological validity, to accurately reflect the free choice individuals have in real life. It was made explicitly clear that once this session was over participants must return to the BOS survey to complete the study. Participants were next asked to report which session they completed (to control for any differences in outcomes between modules). A set of post session questionnaires were then completed including the CATS – SA, WAI – SA and the UES – A. Participants were then fully debriefed and sign posted to mental health resources, should they feel they require them.

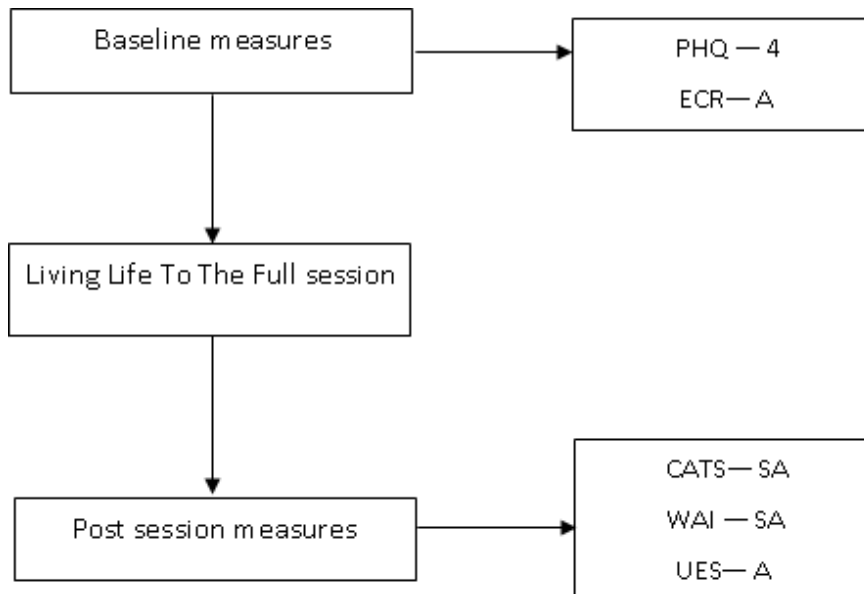


Figure 5.14. General procedure for Study 2b including baseline and post session measures.

5.3.2. Results

Data Screening

The data were screened to determine whether there were significant sources of bias in the data and to ensure the assumptions of parametric data were met. Boxplots of the main outcomes were screened for outliers. Three outliers in the UES – A and the WAI – SA were apparent, however they were not extreme outliers and so not a cause for concern. Histograms illustrated typically normal distributions, and there were no significant issues with skew or kurtosis. On the whole, the large sample size meant normality should not be an issue (Field, 2013). However, individual issues surrounding assumptions were considered with each statistical analysis. For the sake of accounting for any bias in the data, bias corrected and accelerated confidence intervals based on 1000 bootstrap samples were computed and reported in the square brackets. The demographic characteristic of the 175 participants who took part in the study are

described in Table 5.7. Descriptive analyses were conducted on the main variables of analysis and are reported in Table 5.8.

Table 5.7: Table describing the characteristics of the study participants (N = 175).

Demographic Variable	N (%)
Age (M, S.D)	20.04 (3.37)
Gender	
Male	49 (27.4%)
Female	126 (72%)
Transgender	1 (0.6%)
Ethnicity	
White	142 (81.1%)
Mixed	9 (5.1%)
Black or Black British	8 (4.6%)
Asian or Asian British	7 (4.0%)
Chinese	7 (4.0%)
Other	2 (1.1%)
Medication	
Yes	13 (7.4%)
No	162 (92.6%)
PHQ – 4 (M, S.D)	3.87 (3.15)
PHQ – 4 Severity Category	
Normal	80 (45.7)
Mild	48 (27.4%)
Moderate	30 (17.1%)
Severe	17 (9.7%)

Data in context.

The mean score for this sample on the CATS secure scale was 43 ($M = 42.62$, $S.D = 9.98$) out of a possible 78. A one sample t test showed this mean was significantly lower than the scale midpoint: $t(174) = -3.82$, $p < .001$. This suggests participant attachment to the program was low. Global WAI –SA scores were an average 37 ($M = 36.77$, $S.D = 8.83$) out of a possible 60. One sample t test showed this average was not significantly different from the neutral midpoint: $t(174) = 1.15$, $p = .25$. This suggests

WAI – SA global scores were typically neither particularly good nor poor. Average engagement with the LLTTF was typically good, with mean scores on the UES being around 94 ($M = 94.50$, $S.D = 20.28$) out of a possible score of 155. However, this average was not significantly different from the neutral midpoint; $t(174) = .98$, $p = .33$. This would imply engagement with the program was not particularly high or low. All statistics are reported in Table 5.8.

Table 5.8: Descriptive statistics for each main variable of analysis and results of t – tests determining whether mean responses were higher or lower than the scale midpoint.

Measure	Minimum	Maximum	M	$S.E$	$S.D$	t – test
CATS – SA	13	78	42.62	0.75	9.98	$t(174) = -3.82^{***}$
WAI – SA	12	60	36.77	0.67	8.83	$t(174) = 1.15$
UES – A	31	155	94.50	1.53	20.28	$t(174) = .98$

Note: Minimum and Maximum refer to the possible lowest and highest scores for each scale. $***p < .001$

Program specific attachment

Results from the hierarchical multiple regression analysis showed for Step 1, attachment anxiety and avoidance accounted for only 0.6% of the variance in CATS – SA scores ($R^2 = .006$). Step 1 did not significantly predict client attachment to the program, $F(2, 172) = .49$, $p = .61$. Inclusion of the interaction term in Step 2 increased the amount of variance accounted for to 3.3% ($R^2 = .033$, $R^2_{\text{change}} = .027$), however Step 2 also did not significantly improve the ability to predict scores on the CATS – SA, $F(3, 171) = 1.95$, $p = .12$. Parameters for Step 2 (see Table 5.9) indicate the interaction term was the only significant contributor to the model, $\beta = -.18 [-3.60, 0.06]$, $t(171) = -2.20$,

$p = .03$. For attachment anxiety, $\beta = -10 [-2.45, 0.38]$, $t(171) = -1.30$, $p = .20$ and for attachment avoidance $\beta = -.06 [-2.65, 1.38]$, $t(171) = -.81$, $p = .42$.

The significant interaction effect was explored using a simple slopes analysis. In this analysis, global CATS – SA scores were the outcome variable (Y), attachment avoidance was the focal predictor variable (X) and attachment anxiety as the moderator variable (M) and the interaction term was computed by the macro. The simple slopes analysis (see Table 5.10) revealed a significant interaction effect of anxiety and avoidance on CATS – SA scores, $b = -1.90$, $t(171) = -2.10$, $p = .04$. When attachment avoidance was low, there was no significant relationship between attachment anxiety and CATS – SA: $b = 0.69$, 95% CI $[-1.17, 2.57]$, $t = .77$, $p = .46$. At the mean value of attachment avoidance, there was no significant relationship between attachment anxiety and CATS – SA: $b = -0.96$, $[-2.53, 0.62]$, $t = -1.20$, $p = .23$. When attachment avoidance was high, there was a significant negative relationship between attachment anxiety and CATS – SA scores: $b = -2.61$, $[-5.13, -0.09]$, $t = -2.05$, $p = .04$. The Johnson – Neyman method indicated an attachment avoidance value of .6875 as the threshold for significance. It is from this value that the relationship between attachment anxiety, avoidance and CATS – SA is significant ($b = -2.26 [-4.53, 0.00]$, $t = -1.97$, $p = .05$). These relationships are illustrated in Figure 5.15. These results demonstrate that when attachment anxiety and attachment avoidance were high, the two constructs interacted to produce a less secure attachment to the program.

Table 5.9: Linear model of attachment as predictors of CATS – SA scores with 95% bias corrected and accelerated confidence intervals reported in the parentheses.

Confidence intervals and standard errors based on 1000 bootstrap samples.

	<i>b</i>	SE β	β	<i>p</i>
Step 1				
Constant	42.62 (41.05, 44.11)	0.76		$p < .001$
Anxiety	-0.44 (-2.04, 0.93)	0.71	-.05	$p = .534$
Avoidance	-0.62 (-2.65, 1.46)	0.88	-.05	$p = .483$
Step 2				
Constant	42.81 (41.21, 44.27)	0.75		$p < .001$
Anxiety	-0.96 (-2.45, 0.38)	0.74	-.10	$p = .197$
Avoidance	-0.70 (-2.65, 1.38)	0.87	-.06	$p = .421$
Interaction	-1.90 (-3.60, 0.06)	0.86	-.18	$p = .029$

Note $R^2 = .006$ for Step 1; $\Delta R^2 = .027$ for Step 2.

Table 5.10: Simple slopes analysis of the conditional effect of attachment anxiety on CATS – SA scores at different levels of attachment avoidance.

<i>Level of attachment avoidance</i>	<i>b</i>	SE β	<i>t</i>	<i>p</i>
Low	0.70 (-1.02, 2.42)	0.87	.79	$p = .425$
Mean	-0.96 (-2.42, 0.50)	0.74	-1.30	$p = .197$
High	-2.61 (-4.10, -0.23)	1.21	-2.16	$p = .032$

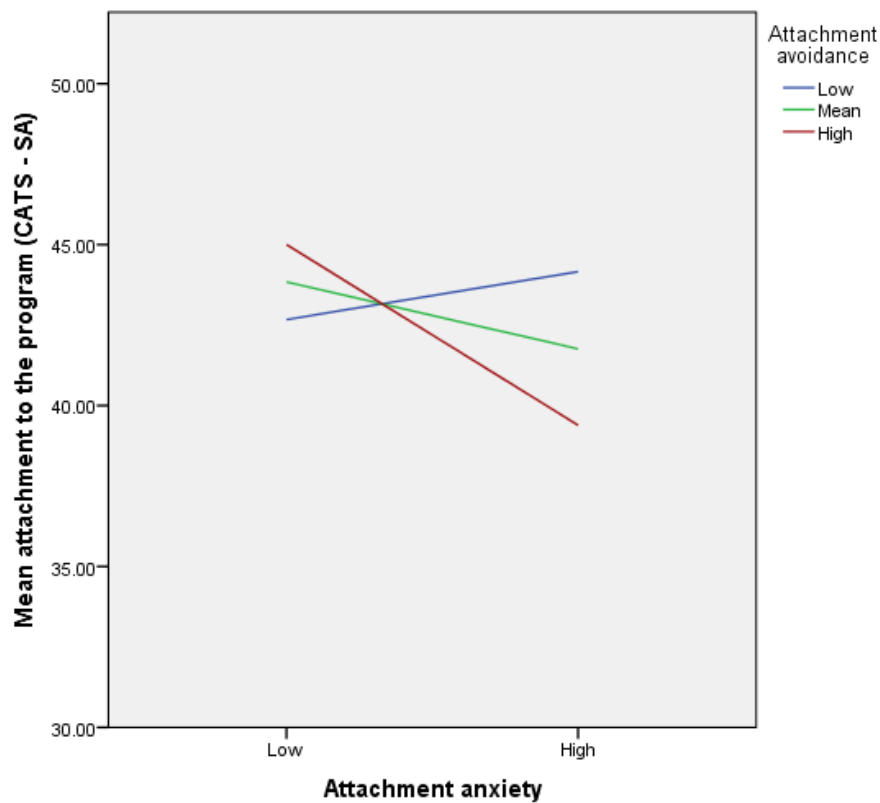


Figure 5.15. Simple slopes plot of the interaction between attachment anxiety, attachment avoidance and how securely participants attached to the program.

Working alliance

Global WAI – SA. A hierarchical multiple regression analysis was conducted with global scores as the outcome variable. For Step 1, attachment anxiety and avoidance accounted for 3.5% of the variation in global scores ($R^2 = .035$) and this model significantly predicted scores on the WAI – SA: $F(2, 172) = 3.16, p = .05$. The inclusion of the interaction term in Step 2 increased the amount of variability accounted for to 6.1% ($R^2 = .061, R^2_{\text{change}} = .026$). Step 2 significantly improved the ability to predict scores on the WAI: $F(3, 171) = 3.72, p = .01, F^{\text{change}}(1, 171) = 4.69, p = .03$. As such, parameters for the final model are reported (see Table 5.11). All attachment variables made significant contributions to the final model. For attachment anxiety $\beta = -$

.17 [-2.78, 0.10], $t(171) = -2.13$, $p = .03$, for avoidance $\beta = -.15$ [-3.35, 0.40], $t(171) = -1.96$, $p = .05$. The interaction term was also a significant contributor to the model: $\beta = -.17$ [-3.06, -0.05], $t(171) = -2.17$, $p = .03$. These results suggest as attachment insecurity increased, the quality of the therapeutic alliance decreased. The interaction term was investigated further to determine the nature of this relationship.

The significant interaction effect was explored using a simple slopes analysis. In this analysis, global WAI – SA scores were the outcome variable (Y), attachment avoidance was the focal predictor variable (X) and attachment anxiety as the moderator variable (M) and the interaction term was computed by the macro. The complete model regression summary again showed these variables significantly predict scores on the WAI – SA: $F(3, 171) = 3.72$, $p = .01$. Again the interaction effect was significant: $b = -1.63$, $t(171) = -2.17$, $p = .03$. Simple slopes analysis revealed the following (see Table 5.12): When attachment anxiety was low, there was a non – significant relationship between attachment avoidance and WAI – SA: $b = 0.05$, [-1.45, 1.54], $t = .06$, $p = .95$. At the mean value of attachment anxiety, there was a significant negative relationship between attachment avoidance and WAI – SA: $b = -1.37$, [-2.65, -.10], $t = -2.13$, $p = .03$. When attachment anxiety was high, there was a significant negative relationship between attachment avoidance and WAI – SA scores: $b = -2.79$, [-4.87, -0.71], $t = -2.65$, $p = .01$. The Johnson – Neyman method indicated an attachment anxiety value of -.0070 as the threshold for significance. It is from this value that the relationship between attachment anxiety, avoidance and WAI is significant ($b = -1.36$ [-2.72, .00], $t = -1.97$, $p = .05$). These relationships are illustrated in Figure 5.16. These results demonstrate that when attachment anxiety and attachment avoidance were high, the two constructs interacted to produce a negative relationship with the therapeutic alliance to the program.

Task subscale. A hierarchical multiple regression was conducted as described previously with task subscale scores as the outcome variable. Results showed for Step 1, a multiple correlation of $R = .16$ and 2.5% of the variance in scores were accounted for ($R^2 = .025$). Attachment anxiety and avoidance as entered in Step 1 only accounted for 3.6% of the variation ($R^2 = .036$) and did not significantly predict scores on the outcome variable: $F(2, 172) = 2.20, p = .11$. Adding the interaction term into Step 2 did not significantly improve ability to predict scores on the outcome: $F(3, 171) = 2.14, p = .10$, $F^{\text{change}}(1, 171) = 1.99, p = .16$. As such, none of the predictor variables were making significant contributions to the model (see Table 5.13). For attachment anxiety, $\beta = -.15$ [-0.98, 0.05], $t(171) = -1.09, p = .06$, for attachment avoidance $\beta = -.10$ [-1.12, 0.35], $t(171) = -1.33, p = .18$. The interaction term was non-significant ($\beta = -.11$ [-1.01, 0.24], $t(171) = -1.41, p = .16$) and therefore a simple slopes analysis was not conducted. Overall it appeared attachment held no association with the task subscale.

Table 5.11: Linear model of attachment as predictors of WAI – SA global scores with 95% bias corrected and accelerated confidence intervals reported in the parentheses. Confidence intervals and standard errors based on 1000 bootstrap samples.

	<i>b</i>	SE β	β	<i>p</i>
Step 1				
Constant	36.76 (35.53, 38.09)	0.66		$p < .001$
Anxiety	-0.93 (-2.35, 0.52)	0.62	-.11	$p = .135$
Avoidance	-1.41 (-3.42, 0.59)	0.76	-.14	$p = .066$
Step 2				
Constant	36.92 (35.80, 38.09)	0.66		$p < .001$
Anxiety	-1.37 (-2.78, 0.10)	0.65	-.17	$p = .035$
Avoidance	-1.49 (-3.34, 0.40)	0.76	-.15	$p = .051$
Interaction	-1.63 (-3.06, -0.05)	0.75	-.17	$p = .032$

Note $R^2 = .035$ for Step 1; $\Delta R^2 = .026$ for Step 2.

Table 5.12: Simple slopes analysis of the conditional effect of attachment anxiety on global WAI – SA scores at different levels of attachment avoidance.

<i>Level of attachment avoidance</i>	<i>b</i>	SE β	<i>t</i>	<i>p</i>
Low	0.05 (-1.45, 1.55)	.76	.06	$p = .95$
Mean	-1.37 (-2.65, -0.10)	.65	-2.12	$p = .03$
High	-2.79 (-4.87, -0.71)	1.06	-2.66	$p = .01$

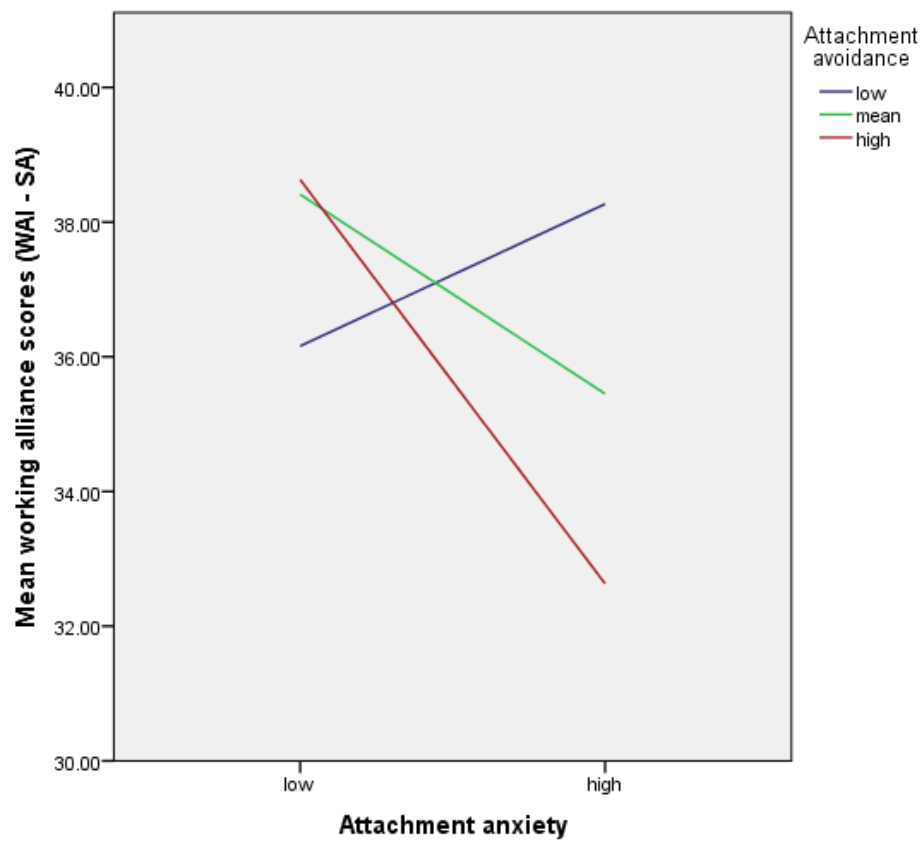


Figure 5.16: Simple slopes plot of the interaction between attachment anxiety, attachment avoidance and the working alliance (global).

Table 5.13: Linear model of attachment as predictors of WAI – SA task subscale scores with 95% bias corrected and accelerated confidence intervals reported in the parentheses. Confidence intervals and standard errors based on 1000 bootstrap samples.

	<i>b</i>	SE β	β	<i>p</i>
Step 1				
Constant	12.51 (11.97, 13.02)	0.26		$p < .001$
Anxiety	-0.37 (-0.86, 0.13)	0.24	-.12	$p = .127$
Avoidance	-0.38 (-1.14, 0.38)	0.30	-.10	$p = .206$
Step 2				
Constant	12.56 (11.98, 13.09)	0.26		$p < .001$
Anxiety	-0.48 (-0.98, 0.05)	0.25	-.15	$p = .058$
Avoidance	-0.40 (-1.12, 0.35)	0.30	-.10	$p = .184$
Interaction	-0.42 (-1.01, 0.25)	0.30	-.11	$p = .159$

Note $R^2 = .025$ for Step 1; $\Delta R^2 = .036$ for Step 2.

Bond subscale. Hierarchical multiple regression analysis was conducted as described with the bond scores as the dependent variable. For Step 1 in which only attachment anxiety and avoidance were entered there existed a multiple correlation of $R = .17$ and these variables accounted for 2.8% of the variance in the outcome ($R^2 = .028$). Model 1 did not significantly predict scores on the bond subscale: $F(2, 172) = 2.50, p = .09$. Including the interaction term in Model 2 increased the amount of variance accounted for to 4.7% ($R^2 = .047, R^2_{\text{change}} = .019$). The final model significantly predicted scores on the bond subscale: $F(3, 171) = 2.82, p = .04$. Attachment avoidance was the only predictor making a significant contribution to the model: $\beta = -.17 [-1.24, 0.09], t(171) = -2.22, p = .03$. For attachment anxiety $\beta = -.08 [-0.80, 0.26], t(171) = -$

1.02, $p = .31$ and for the interaction $\beta = -.15 [-1.96, 0.04]$, $t(171) = -1.84$, $p = .07$.

Therefore there was a significant negative relationship between attachment avoidance and scores on the WAI – SA bond subscale; as attachment avoidance increased, feelings of bond with the program decreased. See Table 5.14 for full model parameters.

Table 5.14: Linear model of attachment as predictors of WAI – SA bond subscale scores with 95% bias corrected and accelerated confidence intervals reported in the parentheses. Confidence intervals and standard errors based on 1000 bootstrap samples.

	<i>b</i>	SE β	β	<i>p</i>
Step 1				
Constant	11.75 (11.24, 12.22)	0.25		$p < .001$
Anxiety	-0.11 (-0.63, 0.42)	0.24	-.04	$p = .648$
Avoidance	-0.63 (-1.30, 0.16)	0.29	-.16	$p = .035$
Step 2				
Constant	11.81 (11.25, 12.26)	0.25		$p < .001$
Anxiety	-0.25 (-0.80, 0.26)	0.25	-.08	$p = .309$
Avoidance	-0.65 (-1.25, 0.09)	0.29	-.17	$p = .028$
Interaction	-0.54 (-1.06, 0.04)	0.29	-.15	$p = .067$

Note $R^2 = .028$ for Step 1; $\Delta R^2 = .019$ for Step 2.

Goal subscale. Multiple regression analysis was conducted as previously described with goal subscale scores as the outcome variable. For Step 1 in which attachment anxiety and attachment avoidance were entered into the model there existed a multiple correlation of $R = .22$ and the variables accounted for 4.8% of the variation in the outcome ($R^2 = .048$). Model 1 also significantly predicted scores on the goal

subscale: $F(2, 172) = 4.35, p = .04$. The addition of the interaction term in Model 2 increased the amount of variation accounted for to 9.0% ($R^2 = .090, R^{2 \text{ change}} = .042$). The final model significantly improved ability to predict scores on the goal subscale beyond step one: $F(3, 171) = 5.64, p = .001$ and $F^{\text{change}}(1, 171) = 7.88, p = .006$. Parameters for the final model (see Table 5.15) show attachment anxiety and the interaction term significantly contributed to the model, however, attachment avoidance did not. For attachment anxiety $\beta = -.24 [-1.03, -.021], t(171) = -3.07, p = .00$ and for attachment avoidance $\beta = -.13 [-1.02, 0.16], t(171) = -1.81, p = .07$. The interaction term made a significant contribution to the model $\beta = -.22 [-1.15, -.010], t(171) = -2.81, p = .01$, therefore this was followed up with a simple slopes analysis.

The significant interaction effect was explored using a simple slopes analysis. In this analysis WAI – SA goal subscale scores were the outcome variable (Y), attachment anxiety was the focal predictor variable (X) and attachment avoidance as the moderator variable (M) and the interaction term was computed by the macro. The complete model regression summary showed the attachment variables significantly predicted scores on the goal subscale: $F(3, 171) = 5.64, p = .001$ and the interaction effect was significant: $b = -.68, t(171) = -2.81, p = .01$. Simple slopes analysis (see Table 5.16) showed when attachment avoidance was low, there was a non – significant relationship between attachment anxiety and goal subscale: $b = -.05, 95\% \text{ CI } [-0.53, 0.43], t = -.18, p = .85$. At the mean value of attachment avoidance, there was a significant negative relationship between attachment anxiety and goal subscale: $b = -.63, 95\% \text{ CI } [-1.04, -.023], t = -3.07, p = .00$. When attachment avoidance was high, there was a significant negative relationship between attachment anxiety and goal subscale: $b = -1.22, 95\% \text{ CI } [-1.89, -.056], t = -3.62, p < .001$. The Johnson – Neyman method indicated an attachment avoidance value of $-.3129$ as the threshold for significance. It is from this value that the

relationship between attachment anxiety, avoidance and the goal subscale is significant ($b = -.42$, 95% CI $[-0.85, 0.00]$, $t = -1.97$, $p = .05$). These results demonstrate that when attachment anxiety and attachment avoidance were high, the two constructs interacted to produce a negative relationship with scores on the WAI – SA goal subscale. These relationships are illustrated in Figure 5.17.

Table 5.15: Linear model of attachment as predictors of WAI – SA goal subscale scores with 95% bias corrected and accelerated confidence intervals reported in the parentheses. Confidence intervals and standard errors based on 1000 bootstrap samples.

	<i>b</i>	SE β	β	<i>p</i>
Step 1				
Constant	12.49 (12.10, 12.90)	0.21		$p < .001$
Anxiety	-0.45 (-0.83, -0.05)	0.20	-.17	$p = .025$
Avoidance	-0.41 (-1.03, 0.26)	0.25	-.12	$p = .099$
Step 2				
Constant	12.50 (12.15, 12.96)	0.21		$p < .001$
Anxiety	-0.64 (-1.03, -0.21)	0.21	-.24	$p = .002$
Avoidance	-0.44 (-1.02, 0.16)	0.24	-.13	$p = .072$
Interaction	-0.68 (-1.15, -0.10)	0.24	-.22	$p = .006$

Note $R^2 = .048$ for Step 1; $\Delta R^2 = .042$ for Step 2.

Table 5.16: Simple slopes analysis of the conditional effect of attachment anxiety on WAI – SA goal subscale scores at different levels of attachment avoidance.

<i>Level of attachment avoidance</i>	<i>b</i>	<i>SE β</i>	<i>t</i>	<i>p</i>
Low	-0.05 (-0.53, 0.43)	0.24	-.19	<i>p</i> =.850
Mean	-0.63 (-1.04 , -0.23)	0.21	-3.07	<i>p</i> =.002
High	-1.22 (-1.89, -0.56)	0.34	-3.62	<i>p</i> <.001

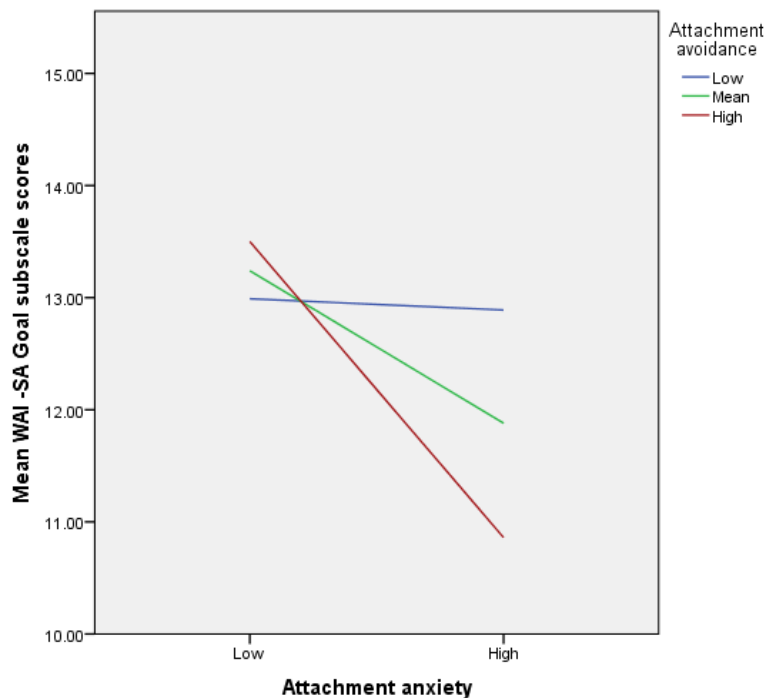


Figure 5.17. Simple slopes plot of the interaction between attachment anxiety, attachment avoidance and the working alliance goal subscale.

User engagement

A hierarchical multiple regression analysis conducted with UES – A as the outcome variable showed that attachment anxiety and avoidance (step one) had a multiple correlation with engagement of $R = .20$. Step 1 also accounted for 4.0% of the

variance ($R^2 = .040$) and significantly predicted UES – A scores: $F(2, 172) = 3.57, p = .03$. With the interaction term added in Step 2, the amount of variance accounted for increased to 7.5% ($R^2 = .075, R^2_{\text{change}} = .035$). The final model significantly improved ability to predict scores on the UES – A: $F(3, 171) = 4.60, p = .01$ and $F^{\text{change}}(1, 171) = 6.45, p = .01$. Model parameters (see Table 5.17) showed attachment anxiety significantly contributed to the model ($\beta = -.21 [-6.80, -1.23], t(171) = -2.74, p = .01$) as did the interaction term ($\beta = -.20 [-7.95, -0.62], t(171) = -2.54, p = .01$). Attachment avoidance did not make a significant contribution to the model: $\beta = -.12 [-6.63, 0.98], t(171) = -1.68, p = .10$. This suggests attachment anxiety and attachment avoidance significantly predict user engagement with unguided CCBT.

The significant interaction effect was followed up by a simple slopes analysis. This showed when attachment avoidance was low, there was a non – significant relationship between attachment anxiety and user engagement: $b = -.24, 95\% \text{ CI } [-3.65, 3.18], t = -.14, p = .89$. At the mean value of attachment avoidance, there was a significant negative relationship between attachment anxiety and UES – A scores: $b = -4.03, 95\% \text{ CI } [-6.93, -1.12], t = -2.74, p = .01$. When attachment avoidance was high, there was a significant negative relationship between attachment anxiety and user engagement: $b = -7.82, 95\% \text{ CI } [-12.57, -3.07], t = -3.25, p = .00$. The Johnson – Neyman method indicated an attachment avoidance value of $-.2382$ as the threshold for significance. It is from this value that the relationship between attachment anxiety, avoidance and UES – A is significant ($b = -.299, 95\% \text{ CI } [-5.98, 0.00], t = -1.97, p = .05$). These relationships are shown in Figure 5.18. These results demonstrate that when attachment anxiety and attachment avoidance were high, the two constructs interacted to produce a negative relationship with user engagement with unguided CCBT.

Table 5.17: Linear model of attachment as predictors of UES – A scores with 95% bias corrected and accelerated confidence intervals reported in the parentheses. Confidence intervals and standard errors based on 1000 bootstrap samples.

	<i>b</i>	SE β	β	<i>p</i>
Step 1				
Constant	94.50 (91.39, 97.51)	1.51		<i>p</i> < .001
Anxiety	-2.84 (-5.73, 0.22)	1.42	-.15	<i>p</i> = .046
Avoidance	-2.71 (-6.64, 1.45)	1.75	-.12	<i>p</i> = .124
Step 2				
Constant	94.92 (91.74, 98.04)	1.50		<i>p</i> < .001
Anxiety	-4.03 (-6.80, -1.23)	1.47	-.21	<i>p</i> = .007
Avoidance	-2.90 (-6.63, 0.98)	1.73	-.12	<i>p</i> = .095
Interaction	-4.36 (-7.95, -0.62)	1.72	-.20	<i>p</i> = .012

Note R^2 = .040 for Step 1; ΔR^2 = .035 for Step 2.

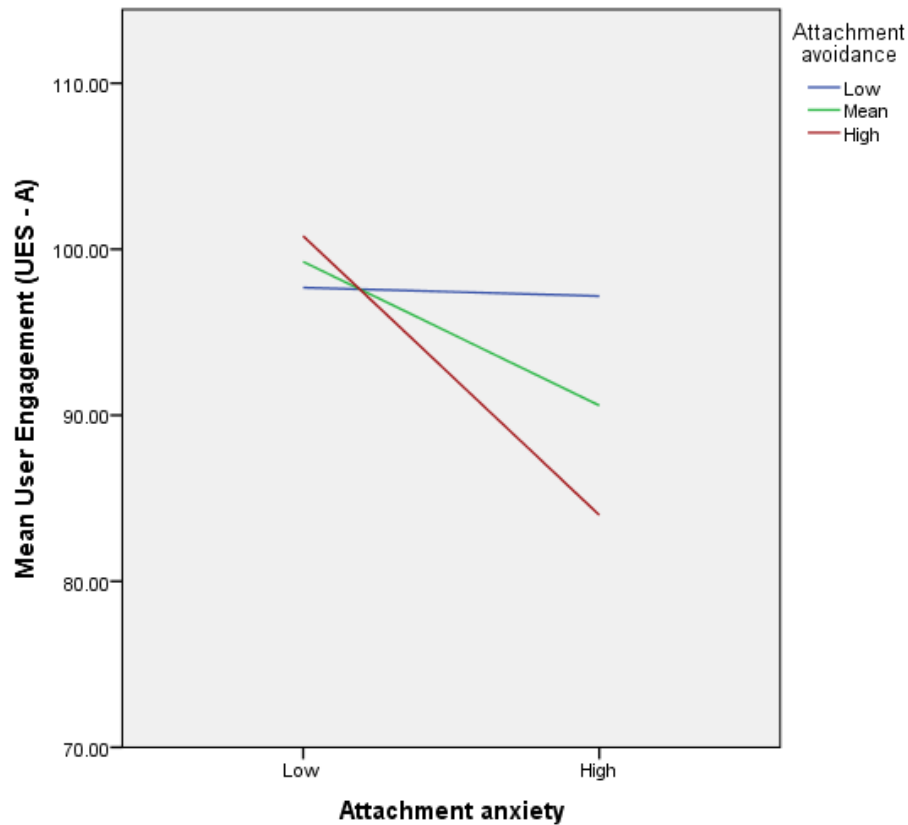


Figure 5.18. Simple slopes plot of the interaction between attachment anxiety, attachment avoidance and user engagement.

Differences between modules

As mentioned in the procedure section, participants reported which LLTTF module was completed. To assess whether any significant differences in outcomes existed between modules one way (module; 1. “Why do I feel so bad?” 2. “How to fix almost anything”, 3. “10 things to make you feel happier straight away”, 4. “I can’t be bothered doing anything” and 5. “I am not good enough”) multivariate analysis of variance was conducted with CATS – SA, WAI – SA and UES – A as the dependent variables. Levene’s test indicated the assumption of equal variances had been met (all p ’s $> .05$) and Box’s Test of Equality of Covariance Matrices was non-significant (Box’s $M = 123.84$, $F(84, 14143.21) = .1.30$, $p = .07$) meaning MANOVA was appropriate.

Using Pillai's Trace, there was no significant difference in outcomes between modules, $V = 0.09$, $F(24.00, 672.00) = .63$, $p = .91$. As such the reliability of the results reported were not compromised by allowing participants to choose which module to complete.

5.3.3. Discussion.

This study aimed to explore whether the adult attachment styles were associated with the alliance and engagement with an unguided CCBT program in vivo. There were significant interaction effects of attachment anxiety and avoidance on program attachment, working alliance and engagement. This meant that when attachment anxiety and avoidance were high, the two constructs interacted to produce negative relationships with the CATS – SA, the global WAI scale, the WAI *Goal* subscale and the UES – A. Only attachment avoidance was negatively associated with scores on the WAI *Bond* subscale, meaning as attachment avoidance increased, scores on the *Bond* subscale decreased. There were no significant associations between adult attachment and scores on the WAI *Task* subscale. As attachment insecurity increased, secure program attachment, working alliances and program engagement decreased linearly. Overall, these results mirror what would be expected from the literature concerning traditional face to face therapies.

Secure attachment to the program

A significant interaction effect of attachment avoidance and anxiety on CATS – SA scores showed a negative relationship between anxiety and avoidance (combined) and how securely participants attached to the program. In other words, highly anxious and avoidant individuals report markedly reduced 'secure' attachment to the program. Mallinckrodt et al. (2005) reported that people scoring highly on the CATS secure subscale perceive their therapist as accepting, responsive and providing a 'secure base'

from which to explore their problems. Furthermore, these individuals tended to report positive therapeutic alliances and were, themselves judged to be prototypically ‘secure’ (Mallinckrodt et al., 2005). In the present study, the ability to form a secure attachment with the program was impaired by having a highly insecure attachment style (high on attachment anxiety and avoidance), the converse being true for highly secure individuals (low on attachment anxiety and avoidance). People high on attachment security rated the program as being more accepting and responsive than those low on attachment security. This extends the findings of Mallinckrodt et al. (2005) by demonstrating how highly secure individuals have a greater capacity to form an attachment to an unguided CCBT program which in itself may have the characteristics of a secure attachment.

The therapeutic alliance

Results from the present study show adult attachment styles were associated with the quality of the therapeutic alliance with unguided CCBT in vivo. When scores on attachment avoidance and anxiety were high (the individual was highly insecure on both the anxiety and avoidance dimensions; e.g. fearful - avoidant) there was a negative association with global WAI – SA scores. Overall this suggests that individuals who were highly insecure/fearful – avoidant had a poorer quality therapeutic alliance with unguided CCBT than those who were typically secure. This result is consistent with traditional therapy literature and corroborates the study hypothesis. For example, a meta-analysis of 24 studies of individual adult outpatient therapies demonstrated higher avoidance and higher anxiety predicted worse therapeutic alliance (Bernecker et al., 2014). Results from a similar meta-analysis (Diener & Monroe, 2011) showed greater attachment security predicted better therapeutic alliance scores across 17 studies. The present results suggest this pattern extends to unguided, online CCBT in which there is no human support.

As with the global scores, high attachment insecurity negatively predicted scores on the *Goal* subscale. As such, individuals high on attachment insecurity reported feeling less like they were working towards mutually agreed upon goals with the program. This finding is consistent with what would be expected from the traditional therapy literature which states individuals who are highly secure establish higher levels of agreement on tasks and goals of therapy than those who are highly insecure (Dolan, Arnkoff & Glass, 1993). Attachment avoidance negatively predicted scores on the *Bond* Subscale. This meant individuals who were highly avoidant found difficulty developing a bond with the automated alliance features of the program. This finding is consistent with what would be expected from previous literature on attachment and *Bonds* in face to face therapy. Individuals who are typically avoidant in their attachment styles are reluctant to connect and self –disclose to therapists on personal level (Eames & Roth, 2000) and are less emotionally committed to treatment (Korfmacher et al., 1997). Such tendencies impede the development of a good quality bond, encompassing perceptions of mutual trust, acceptance, and confidence (Satterfield & Lyddon, 1998). The results of the present study suggest these avoidant tendencies extend to unguided CCBT programs.

Adult attachment had no significant association with and did not predict scores on the *Task* subscale. This finding is not consistent with the traditional therapy literature. Typically, highly secure individuals are in more agreement on the tasks of therapy than those who are highly insecure (Dolan, et al., 2003). Participants in the present study only completed one taster session of the program. Questions on the *Tasks* subscale tap into aspects of the therapeutic process which may not be accurately judged after one session. For example, “The program and I agree about the things I will need to do in therapy to help improve my situation” may not be relevant because participants were

conducting one session, not a whole course of CCBT in which tasks would need agreement upon. Another explanation is that the program itself may not have sufficiently translated the *Task* aspect of the therapeutic alliance.

Program engagement

A significant interaction effect showed that when scores on attachment avoidance and anxiety were high, engagement with unguided CCBT significantly decreased. Therefore, highly insecure individuals showed worse engagement with unguided CCBT compared to those who were highly secure. This study is the first to demonstrate this association between insecure adult attachment styles and engagement with unguided CCBT. This finding corroborates the study hypothesis. Given the same highly insecure attachment pattern is also associated with poorer therapeutic alliance (as outlined above) it is plausible to assume the two outcomes are linked. Individuals high in attachment insecurity fail to establish a good quality working alliance with the program, which in turn may hinder motivation to engage with the program. Evidence for this explanation comes from the finding that scores on the WAI – SA were significantly correlated with scores on the UES ($r = .74, p < .001$). This positive relationship shows engagement increases as better quality therapeutic alliances were formed. Previous studies into adherence with psychotherapy and mental health services demonstrate an association between the therapeutic alliance and treatment adherence. For example, studies have illustrated a relationship between the therapeutic alliance and client instigated, early termination of psychotherapy (Gelso & Carter, 1985; Tryon & Kane, 1990). Poor therapeutic alliance has been shown to predict worse service engagement and non - adherence in individuals with early psychosis (Lecomte, 2008). Regardless of the precise mechanisms it is evident that highly anxious – avoidant

individuals demonstrated significantly worse program engagement than highly secure individuals.

Conclusions

This study was a unique investigation into how adult attachment patterns are associated with the therapeutic alliance and engagement with unguided online CCBT. Based on a sample of 175 participants, results illustrated a significant interaction effect of attachment anxiety and avoidance on the program specific attachment, the therapeutic alliance and engagement with unguided CCBT. Higher attachment anxiety and avoidance combined significantly reduced engagement and the strength of the therapeutic alliance. Conversely, higher attachment security was associated with higher engagement and better therapeutic alliance with LLTTF. These findings mirror what is evidenced in face to face therapy, in which higher attachment insecurity is associated with impediments in the formation of a good quality therapeutic alliance and poorer engagement with psychotherapy (Bernecker et al., 2014; Diener & Monroe, 2011). This is the first study to demonstrate such a relationship between attachment styles, therapeutic alliances and engagement exists in the context of unguided, pure self – help CCBT. These results add to our understanding of the variables which influence in – treatment behaviour, including the factors which influence sustained engagement and disengagement from unguided CCBT.

5.4. Chapter Discussion

These studies aimed to explore the associations between adult attachment, the therapeutic alliance and engagement with guided and unguided CCBT in vivo. For guided CCBT neither attachment anxiety nor avoidance significantly predicted the program specific attachment, the quality of the working alliance or engagement with the program. Overall, the dimensions of adult attachment were not significantly associated with the therapeutic process or engagement with a guided CCBT program and did not mirror the relationships evident in traditional therapies. For unguided CCBT the results indicated these associations were apparent. Specifically, significant interaction effects of attachment anxiety and avoidance meant when an individual scored high on both dimensions the two constructs interacted to produce negative relationships with scores on program specific attachment, the therapeutic alliance and engagement. Essentially, therapeutic alliances were poorer and engagement was worse for individuals who were highly insecure.

Implications for theory and research

The findings of Study 2a suggest that dispositional adult attachment does not have a significant bearing on the use of guided CCBT. The attachment system may not be activated in the same way as in traditional therapy, or is influencing the user – supporter aspect of the alliance rather than the user – program alliance. This means client internal working models do not influence the therapeutic process in guided CCBT as in traditional therapy. In traditional therapy, it is maintained that the therapeutic relationship is a specialised form of attachment with the therapist analogous to a primary care giver (Bowlby, 1988; Gold, 2011). Even though there is a human being available for support, this relationship may not be equivalent to that of the therapeutic

relationship. This would explain why some studies have not found a relationship between the working alliance and clinical outcomes in guided CCBT (Andersson et al., 2012) and why the meta analysis presented in Chapter 2 did not find a significant moderating effect of therapeutic support time on therapy outcomes (Grist & Cavanagh, 2013). This also provides support for the proposition that the means for change in CCBT may include relational factors which are not identical to those in traditional therapy (Cavanagh & Millings, 2013a). It also provides strong corroboration for conceptualising therapeutic change as a client accomplishment (Cavanagh, Zack & Shapiro, 2003). Future research should explore the therapeutic relationship in CCBT using qualitative research methods. This would provide client feedback on how they perceive the therapeutic relationship in guided CCBT and whether more cognitive attention is afforded to the user – supporter or the user – program aspects of the triangle of alliance. It would also permit comparisons between the relationship developed between the client and the program, the person providing therapeutic support and any other source of support the individual is receiving (Cavanagh, 2010).

The unique contribution to theory by Study 2b is the demonstrated association between adult attachment styles, the therapeutic alliance and engagement with unguided online CCBT in vivo. This study therefore draws together three aspects of psychotherapy process research (attachment, alliance and engagement) to produce conclusions which may be of benefit to e – health theory and dissemination. A prominent question in the field of CCBT is whether the therapeutic relationship exists in this context and if so, how it differs from that of traditional, therapist delivered CBT (Cavanagh & Shapiro, 2004; Gega et al., 2013). Results from Study 2b indicate that not only is the therapeutic alliance viable in unguided CCBT, but is the first study to

demonstrate highly insecure individuals form poor therapeutic alliances with unguided online CCBT in a manner reflective of face to face therapies.

The results of this study also demonstrate the concept of a therapeutic alliance is not lost in the context of unguided CCBT. Even though WAI - SA scores were typically neutral, they were not particularly poor. This finding adds to the emerging evidence which shows the development of a therapeutic relationship is possible in the context of online CCBT (Andersson et al., 2012; Bergman Nordgren, Carlbring, Linna & Andersson, 2013) and extends this to fully automated, unguided online CCBT. Such findings are contrary to the concerns of some research and professionals who naturally question whether a therapeutic relationship can exist in the context of CCBT (Helgadóttir et al., 2009; Macleod et al., 2009; Stallard et al., 2010). By demonstrating the formation of a therapeutic alliance is possible in fully automated, pure self-help approaches, this raises more questions as to the role of the therapist, the embodiment of alliance features and the therapeutic alliance in online CCBT. As outlined by Cavanagh and Millings (2013a), dismantling work is still necessary to determine the mechanisms by which therapeutic change occurs in e – health applications. The results illustrated in this study show some of the conclusions about attachment and the therapeutic alliance in traditional therapy may be transferable to the field of e – health, but these preliminary results require further experimental investigation.

As program attrition is one of the fundamental challenges of e – health applications (Eysenbach, 2005) research efforts are required to understand the factors which influence engagement with CCBT programs in order to maximise their dissemination potential. Results from Study 2b provide evidence that people who are highly insecure in their attachment styles may have difficulty with sustained program engagement. In regards to the process based model of engagement, adult attachment

styles can be added as a factor influencing features of sustained program engagement (see Figure 5.19). Evidence suggests individuals who are highly insecure in their attachment tend to drop out from traditional psychotherapy before treatment completion (Dozier, 1990; Korfmacher et al., 1997; Sharf, Primavera & Diener, 2010). The present results are the first to illustrate this ‘attrition tendency’ extends to unguided CCBT.

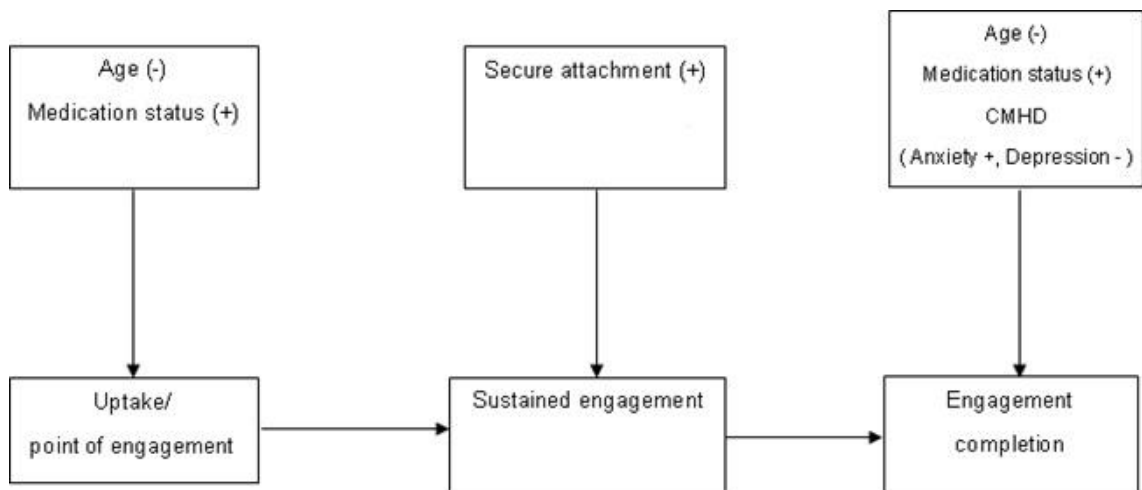


Figure 5.19. Diagram of the process based model of engagement highlighting the addition of dispositional attachment style as a client factor which influences aspects of sustained program engagement which includes; attachment to the program, the therapeutic alliance and active program engagement.

The differences in results between Study 2a and 2b provide evidence for the threat prime hypotheses of how the removal of human support activates the adult attachment system. Overall, it appears there is something intrinsic in the nature of individuals both highly anxious and highly avoidant which impedes their ability to form a good quality therapeutic alliance with an unguided CCBT program. Because highly insecure individuals do not possess a reliable strategy for dealing with distress, they have a desire to seek reassurance from another human being and do not believe they can

self – manage their therapeutic process (Hunter & Maunder, 2001). The prospect of using unguided CCBT to manage their own distress without reassurance and support from another human being acts as a threat – related prime (or psychological threat) which activates the attachment system. Conversely, those low on attachment anxiety and avoidance (secure individuals) hold a positive view of the self as worthy and a positive view of others as reliable and trustworthy (Bartholomew & Horowitz, 1991). As such these people are comfortable enough to embark on a therapeutic intervention without the need for human therapeutic support, as they already hold an appreciation that they have self-worth which does not depend on the responses of others. Future research could use qualitative techniques to explore this hypothesis further and provide evidence that highly secure individuals are better able to form therapeutic alliances and engage with pure self-help CCBT.

It is not simply enough to activate the attachment system however. As alluded to in the introduction to this chapter, the relationship between attachment and the outcomes studied would only be apparent if the following conditions were met: First, the adult attachment system must be activated. Second, the interaction between the user and the program must be fundamentally social. Finally the program must provide a relational context, such as a therapeutic alliance, for the attachment system to exert its influence on. For Study 2b it appears all of these conditions have been met. Consistent with the computers are social actors theory (Nass et al., 1994) this suggests the program provided the minimal social cues necessary for it to be treated as a social actor. This is the first known study to explicitly apply the CASA paradigm to CCBT and demonstrate programs are treated as social actors. By treating the program as a social actor, and without the added user – supporter interaction, this human – computer interaction

represents the channel through which attachment – related goals and expectations are unconsciously applied to CCBT programs.

Implications for practice

The finding that people highly insecure individuals form poorer therapeutic alliances and demonstrate lower levels of engagement with unguided CCBT has implications for clinical practice. In particular, it suggests that individuals low on attachment anxiety and avoidance (secure people) may be better suited to using this highly cost – effective and efficient medium of delivering CBT because they are able to form better therapeutic alliances and sustain engagement with these programs. Conversely, individuals with a highly insecure attachment styles may not be best suited to being offered completely unguided CCBT without any human therapeutic support. Such individuals may require a guided intervention with human therapeutic support or face to face CBT. A brief screening of attachment styles may help decide the level of therapeutic support offered to clients of CCBT, or whether they are suited to using it at all.

It has been suggested that if attachment effects alliance, targeting attachment during therapy may be a strategy for improving the alliance (Castonguay, Constantino & Holtforth, 2006). Therefore, designing programs to specifically target highly anxious and highly avoidant attachment patterns may benefit the therapeutic alliance and engagement in unguided CCBT. Alternatively, finding a computerised, automated technique to prime attachment security could also potentially benefit the therapeutic alliance and engagement. Research has demonstrated that priming memories of felt security is figuratively equivalent to being exposed to an attachment figure and generates effects that reflect those of dispositional attachment security (Carnelley & Rowe, 2010). Therefore, further research should investigate whether priming a sense of

attachment security overrides dispositional attachment styles and boosts therapeutic alliance and engagement with unguided CCBT.

Limitations

Several limitations of the present study must be taken into account when interpreting the findings of these studies. Firstly, participants only took part in one session of guided or unguided CCBT, however, therapy is a phased process (Sexton, Hembre, & Kvarme, 1996; Tracey, 1993). The influence of attachment styles on alliance scores may therefore fluctuate from session to session. For Study 2a this means a relationship between dispositional attachment styles and the therapeutic relationship may emerge as the therapeutic process progresses. For Study 2b this suggests the association between attachment styles and the therapeutic alliance in unguided CCBT may change throughout the course of the intervention. Future research should utilise study paradigms which run the full course of the program. Despite this limitation, the finding that attachment styles are associated with the therapeutic alliance at the beginning of unguided CCBT is important because the alliance is established early in therapy and early alliance ratings are more predictive of outcome and engagement, compared to other phases (Horvath & Symonds, 1991; Piper et al., 1991).

There were no specific inclusion or exclusion criteria for study participation in terms of actually experiencing a CMHD and so questions may arise as to whether the results of these samples may be generalised to clinical populations. However, samples from both studies included a majority who were within the mild to severe range for depression or anxiety. For Study 2a 82 out of 149 participants (55%) ranged from mild to severe on their PHQ – 9 scores and 70 out of 149 participants (53%) ranged from mild to severe on their GAD – 7 scores. For Study 2b, 95 out of 175 participants (54.3 %) were classified between the mild – severe depression and anxiety range on the PHQ

– 4. Overall, the study samples appear to cover the full range of CMHD symptom severity.

A main limitation of Study 2a is that the adapted measures did not accurately capture the ‘triangle of alliance’ (Cavanagh, 2010) which may have influenced the pattern of results for that study. In accordance with the computers are social actors paradigm, the wording of the working alliance and client attachment to therapist scales were changed to read ‘the program’ instead of ‘my counsellor’. This measures the human – computer alliance but does not capture the user – support aspect of the alliance triangle. It is also proposed that given the presence of a human supporter, the users’ attachment tendencies would be directed towards the supporter more than the program. Hence if attachment was influencing this aspect of the alliance, the measures utilised did not measure it sufficiently. Furthermore, due to time constraints and resources it was simply not possible to control and account for each aspect of this triangle of alliance. According to the Four P’s model (Cavanagh & Millings, 2013b) a multitude of factors relating to the program, the problem, the person and the provider may influence engagement with CCBT. The nature of the interplay between these variables are complex and require further investigation. Study 2b overcame this by isolating the user – CCBT relationship in unguided CCBT. As the measurement issues discussed concern the human – supporter aspect of the triangle of alliance it is believed the threat priming effects found in Study 2b would still be evident even if the measurement issues of Study 2a were addressed.

Conclusions

These studies are unique investigations into whether the associations between adult attachment styles, the therapeutic alliance and therapy engagement in traditional therapies are mirrored in CCBT contexts which do and do not provide human

therapeutic support. Study 2a demonstrated no significant associations between dispositional adult attachment patterns and these outcomes in the context of guided CCBT. This suggests that the clear relationships between attachment and the therapeutic process in traditional therapies are not simply mirrored in the complex ‘triangle of alliance’ (Cavanagh, 2010) of guided CCBT. This does however provide a framework for further exploration of the nature and role of attachment in guided CCBT and future research should conduct dismantling work to answer the questions raised by these results. Study 2b, which isolated the human – computer interaction of unguided CCBT, revealed significant interaction effects of high attachment anxiety and avoidance on program specific attachment, the working alliance and engagement. It appears these findings are only evident when attachment anxiety and avoidance are high and this may have occurred because high avoidance and anxiety represents the most insecure form of attachment (Bartholomew & Horowitz, 1991) and for these effects to occur this highly insecure threshold needs to be reached. Compared to the other forms of attachment, fearful – avoidance is the most readily associated with the prevention of a strong working alliance, feeling threatened and possessing maladaptive, disorganised ways of dealing with distress (Hunter & Maunder, 2001). Not only do these findings mirror the associations between attachment and these outcomes in traditional therapy but they provide evidence that the removal of human support in unguided CCBT acts as threat – related prime which over activates the attachment system for highly insecure individuals. Overall these findings imply that highly insecure individuals may require extra support to effectively use CCBT interventions and that individuals who are high in attachment security may be the most suited to using highly cost effective, unguided CCBT interventions. As such, further research should explore whether the therapeutic alliance

and engagement with unguided CCBT can be enhanced by priming a sense of attachment security in the individual user.

Chapter 6

The effect of attachment security priming on engagement and alliance in unguided CCBT

6.1. Introduction

Two reoccurring issues with the acceptability and widespread implementation of CCBT appear to be high attrition rates (Eysenbach, 2005; So et al., 2013) and concerns regarding the human factor in CCBT therapies (Leahy, 2008). Although attrition rates from CCBT may be in range of that found in traditional therapies (Kaltenthaler, Sutcliffe et al., 2008; Waller & Gilbody, 2009), high attrition rates from CCBT remain an area for concern, especially for unguided interventions (So et al., 2013). Concerns have also been raised regarding the perceived lack of a therapeutic relationship which is thought to be beneficial for engagement and outcomes. There have been suggestions that CCBT does not contain sufficient attributes of a therapeutic relationship and that its removal in these interventions may be detrimental for client engagement and outcomes (Helgadóttir et al., 2009; Macneil et al., 2009; Whitfield & Williams, 2004). Contrary to these concerns, evidence from a recent qualitative enquiry (Barazzzone et al., 2012) showed the programs incorporated ample automated features essential to establishing the alliance. There were however, fewer features aimed at developing and maintaining the alliance. Furthermore, some evidence suggests that for guided CCBT programs, alliance ratings remain relatively high (Andersson et al., 2012). Evidence from a randomised trial comparing unguided online CBT to therapist delivered email CBT showed perceptions of the overall alliance were similar in each group (Richards, Timulak & Hevey, 2013). However, ratings on the 'Bond' subscale of the WAI were significantly lower in the unguided CBT group. Overall these findings suggest the

concept of a therapeutic alliance remains meaningful when applied to CCBT, however it is still an area for significant improvement.

Despite these limitations, CCBT offers noteworthy advantages. The internet as a treatment modality provides the potential to increase treatment availability, accessibility and reach (Cavanagh & Millings, 2013a). As such, this mode of treatment delivery offers a way to help manage the significant global demand for evidence based psychological interventions which currently (and consistently) outstrips supply (Cavanagh, 2013; Cavanagh & Millings, 2013a; Marks & Cavanagh, 2009; Shafran et al., 2009). Therefore identifying ways to maximise engagement and enhance perceptions of the therapeutic alliance with CCBT is timely, in particular for unguided approaches which require markedly reduced therapist resources.

Confident in the clinical efficacy of CCBT, there have been calls for research to address ways of increasing CCBT adherence (Bennett & Glasgow, 2009; Titov et al., 2008) and identification of factors affecting treatment engagement (Kaltenthaler, Parry et al., 2008; Kaltenthaler, Sutcliffe et al., 2008). Furthermore, no published primary studies to date have provided data concerning the level of active program engagement or level of immersion experienced (Newman et al., 2011). Providing therapeutic support via motivational interviews and telephone support conversations can be effective in promoting engagement with online CBT (Doherty et al., 2012). There are however two significant issues with a blanket utilisation of human therapeutic support to increase engagement. Firstly, there is a deficiency of research addressing the question of *how* human support enhances adherence, with only one published theoretical model ('supportive accountability'; Mohr, Cuijpers & Lehman, 2011) attempting to provide a framework for future investigations. This renders the field of engagement with online CBT without a clear, empirically investigated model to inform the basis of research,

program design and implementation. Secondly, extra, ‘guided’ human therapeutic support increases resource requirements, logistical complications and cost of program implementation (Doherty et al., 2012). Furthermore, there is sufficient evidence to demonstrate unguided self – help programs are clinically effective, even if the magnitude of effect is smaller compared to minimally guided therapies (Grist & Cavanagh, 2013; Newman et al., 2011; Richards & Richardson, 2012; Spek et al., 2007). Perhaps the magnitude of therapeutic effect from unguided programs can be increased by finding new ways to boost engagement with these unguided approaches. Finding such mechanisms has the potential to minimise the cost of program implementation without compromising clinical effectiveness.

Attrition is not unique to online CBT, but is also an issue which effects traditional, therapies (Brawley & Culous – Reed, 2000). Therefore when reflecting on ways to increase adherence to online interventions it is useful to take into account key factors which are known to influence engagement and successful outcomes in face to face therapies (Doherty et al., 2012). Outcome research has provided evidence that client factors are the leading contributor to successful mental health interventions (Assay & Lambert, 1999) as well as good quality therapeutic relationships (Doherty et al., 2012). Adult attachment patterns represent one such personal factor which evidence suggests is associated with both the therapeutic alliance and the way in which people engage with psychotherapy (Daniel, 2006; Diener & Monroe, 2011). As discussed in previous chapters, a dispositional secure adult attachment style is associated with the ability to form better quality therapeutic alliances, better self – disclosure and being more treatment compliant than insecurely attached individuals (Diener et al., 2009; Dozier, 1990; Korfmacher et al., 1997; Mallinckrodt et al., 1995).

To date there are no published studies investigating whether these patterns transpire when the individual is working with CCBT programs where there is a partial or entire absence of human therapeutic support. Given some concerns that standardised online therapeutic programs cannot emulate common factors necessary for a good therapeutic relationship (Helgadóttir et al., 2009; Macneil et al., 2009), research should focus on providing a transparent picture of how the alliance plays out in online therapies, what factors influence it and how it can be improved. Evidence from the empirical studies presented in this thesis indicates attachment dimensions may influence the therapeutic process in CCBT in a fashion that is consistent with the traditional therapy literature. These results lend support to the idea that individuals high on attachment security are typically better able to engage and build working alliances with unguided CCBT than those low on attachment security. Chronically high attachment security is therefore considered the ideal attachment style for optimal engagement and alliance quality. Of course, individual variations in attachment experiences mean not everyone who accesses online CBT will have a dispositional secure attachment style.

Temporary attachment security can however be experimentally primed. Numerous studies have provided sufficient evidence that security priming procedures are effective in boosting a sense of felt security, regardless of chronic attachment style (Carnelley & Rowe, 2007; Mikulincer & Shaver, 2007b, Gillath et al., 2008). In order to appreciate how attachment security priming works it is necessary to understand the cognitive theory behind internal working models (Bowlby, 1973) and how attachment dimensions are founded.

Internal working models are hierarchical cognitive networks

According to attachment theory, early experiences with caregivers are mentally evaluated and stored into internal working models of the self and others (Bowlby, 1973;

Mikulincer, Shaver, Sapir-Lavid & Avihou-Kanza, 2009). These internal working models are essentially hierarchical networks of cognitive representations (Mikulincer & Arad, 1999). The idea is that episodic memories of interactions with caregivers and significant others are stored and paired with declarative knowledge concerning the accessibility, receptiveness and sensitivity of a significant other and of their own cognitive, behavioural and affective reactions to this significant other (Baldwin, Keelan, Fehr, Enns & Koh-Rangarajoo, 1996; Mikulincer & Arad, 1999). It is on this foundation that memories are structured along the anxious and avoidant attachment dimensions and become exemplars of secure, anxious or avoidant episodes for a specific interpersonal relationship (Mikulincer & Arad, 1999).

These exemplar memories create excitatory and inhibitory connections with each other and the activation of one memory will trigger other attachment congruent memories while inhibiting attachment incongruent memories (Anderson, 1994). Over time these associative connections are consolidated, resulting in the creation of relationship – specific schemas, which in turn possess excitatory and inhibitory associations with schemas representing other significant relationships. As the associative links between relationship – specific schemas strengthen, generic relational schemas (representing the secure, anxious and avoidant dimensions) across relationships are formed. As such, a hierarchical associative network is created, in which episodic memories become exemplars of relationship – specific schemas which consequentially become exemplars of generic relational schemas (Baldwin et al., 1996; Mikulincer & Arad, 1999). This hierarchical network is the cognitive foundation of what Bowlby (1973) termed the internal working model. The multiple relational schemas which form the internal working model allow a person to envisage relationships in both secure and insecure terms. A person's chronic, global attachment

style however is represented by the most frequently experienced and easily accessible schema (Baldwin et al., 1996; Bowlby, 1973; Mikulincer & Arad, 1999).

The secure cognitive schema

Secure dispositional attachment styles are cultivated when infants experience responsive and sensitive interactions with caregivers. These interactions are assimilated into the infants' internal working model and a secure cognitive schema is eventually formed (Bowlby, 1973, Mikulincer & Arad, 1999). With the formation of a secure cognitive schema, a sense of 'felt security' is developed (Bowlby, 1973; Sroufe & Waters 1977). This 'felt security' consists of a set of expectations about the accessibility and sensitivity of others in times of distress that are structured around the secure cognitive schema (Mikulincer et al., 2001; Waters, Rodrigues & Ridgeway, 1988). This schema contains a set of 'if – then' propositions which state: *If I encounter an problem and become distressed, I can approach a significant other for support and they are likely to be accessible and reassuring; As a result of being in close proximity to this person I will gain relief and I can return to other activities* (Mikulincer et al., 2001).

Attachment security priming

The existence of multiple relational schemas within the hierarchical framework permits the individual to access attachment exemplars which are different to their global attachment orientation. In other words, although an individual may possess an insecure dispositional attachment style they are able to envisage examples of secure relationships. Attachment priming works on the principles of 'spreading activation' theory (Collins & Loftus, 1975). Take for example a supraliminal security prime in which a person is asked to think about when they had experienced a prototypically secure relationship (e.g. Bartz & Lydon, 2004; Carnelley & Rowe, 2007; 2010); the activation of a 'secure' episodic memory will stimulate other attachment congruent memories and inhibit

attachment incongruent memories thereby spreading the activation of relationship – specific and generic ‘secure base’ cognitive schemas (Gillath, Selcuk & Shaver, 2008; Förster & Liberman, 2007; Mikulincer & Arad, 1999). The internal working model is therefore temporarily dominated by the secure base schema, producing cognitions, affect and behaviours biased towards a secure attachment style (Mikulincer & Arad, 1999). This spreading activation theory explains why priming a security – congruent memory is analogous to exposure to a (secure) attachment figure (Carnelley & Rowe, 2010). It also accounts for why security priming does not interact with dispositional attachment dimensions and produces felt security regardless of dispositional attachment (Carnelley & Rowe, 2007; Mikulincer & Shaver, 2007b, Gillath et al., 2008).

Supraliminal and subliminal priming techniques are both successful in increasing a sense of ‘felt security’ and contextually activating a secure attachment relationship (Carnelley & Rowe, 2007; Gillath et al., 2008). There exists a large body of evidence suggesting priming manipulations bias cognitions, emotions and information processing to be consistent with the primed style of attachment (Arndt, Schimel, Greenberg & Pyszczynski, 2002; Baldwin et al., 1996; Mikulincer et al., 2001; Mikulincer, Shaver, Gillath & Nitzberg, 2005). In one study, securely primed individuals were more likely to react in a secure fashion to threatening relationship scenarios, irrespective of dispositional attachment styles (Gillath & Shaver, 2007). Securely primed individuals demonstrate more positive affect, report more positive interpersonal expectations and are able to recall more positive attachment related words compared to insecurely primed participants (Rowe & Carnelley, 2003).

Study aims and hypothesis

Despite the evidence suggesting unguided online CBT programs are clinically effective, unguided programs tend to suffer from higher attrition rates and lower magnitude of treatment effects than guided programs (Newman et al., 2011; Richards & Richardson, 2012). As such, although these approaches are clinically effective there is much room for improvement. Drawing on the available evidence, it appears security priming could serve to increase engagement and alliance with unguided online CBT, without adding extra to dissemination costs. Given the evidence reviewed, it is proposed that successful security priming procedures temporarily override global attachment styles and bias cognitions in a secure congruent fashion. Individuals high on dispositional attachment security report higher levels of engagement and better therapeutic alliances (Study 2b). It would therefore be logical to propose that security priming would enhance individuals working alliance and engagement with CCBT. The primary aim of this study was to investigate whether online security priming enhances working alliance and engagement with unguided online CBT compared to a neutral prime. Figure 6.1 depicts this in context of the process based model of CCBT engagement.

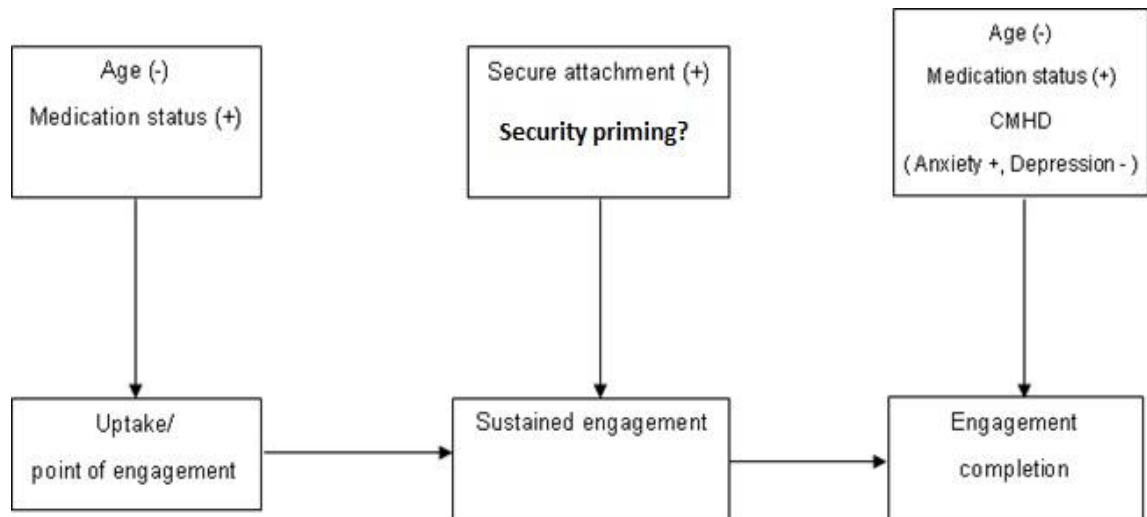


Figure 6.1. Diagram of the aim of this study and its relation to the process based model of CCBT engagement.

If successful there is potential for future research to investigate how repeated online security priming could be incorporated in CCBT design, with the goal of consolidating attachment security, increasing engagement and therapeutic benefit.

On this basis several hypothesis are proposed:

1. It is proposed that compared to a neutral prime, priming attachment security will improve relational and engagement factors associated with the use of CCBT. This will be evidenced by participants in the security prime condition reporting;
 - a. More secure attachment toward the program (CATS)
 - b. Higher working alliance with the program (WAI)
 - c. Higher levels of felt social presence within the program (SPI)
 - d. Higher levels of engagement with the program (UES)
2. Based on previous research (Carnelley & Rowe, 2007; Mikulincer & Shaver, 2007b, Gillath et al., 2008) it is believed the effect of priming

condition will not be moderated by the participants' chronic, global attachment style.

6.2. Method

Participants

90 participants completed the study. Baseline data from completing participants indicated 16 were male (17.8%) and 74 were female (82.2%). Ages ranged from 18 to 33 years ($M = 21.00$, $S.D = 3.63$). Seventy - four were of a White ethnicity (82.2%), five were of a mixed ethnicity (5.6%), two were of a Black or Black British ethnicity (2.2%), four were of an Asian or Asian British ethnicity (4.4%), and five were of a Chinese ethnicity (5.6%). Seven were taking prescribed medication to treat anxiety or depression (6.8%) and 96 were not (93.2%). The average PHQ – 4 score was $M = 3.27$, $S.D = 3.23$. According to PHQ – 4 diagnostic severity, 23 participants (25.6%) demonstrated 'mild' severity, 12 demonstrated 'moderate' severity (13.3%) and seven participants (7.8 %) were classified as suffering from 'severe' depression and/or anxiety. This baseline data for completing participants are detailed in Table 6.1. Participants were all undergraduate students at the University of Sussex who took part in return for course credits. The study received ethical approval from the Cross-Schools Research Ethics Committee (C-REC) of the University of Sussex prior to commencement of the study. The participant flow is reported in the CONSORT diagram (Figure 6.2).

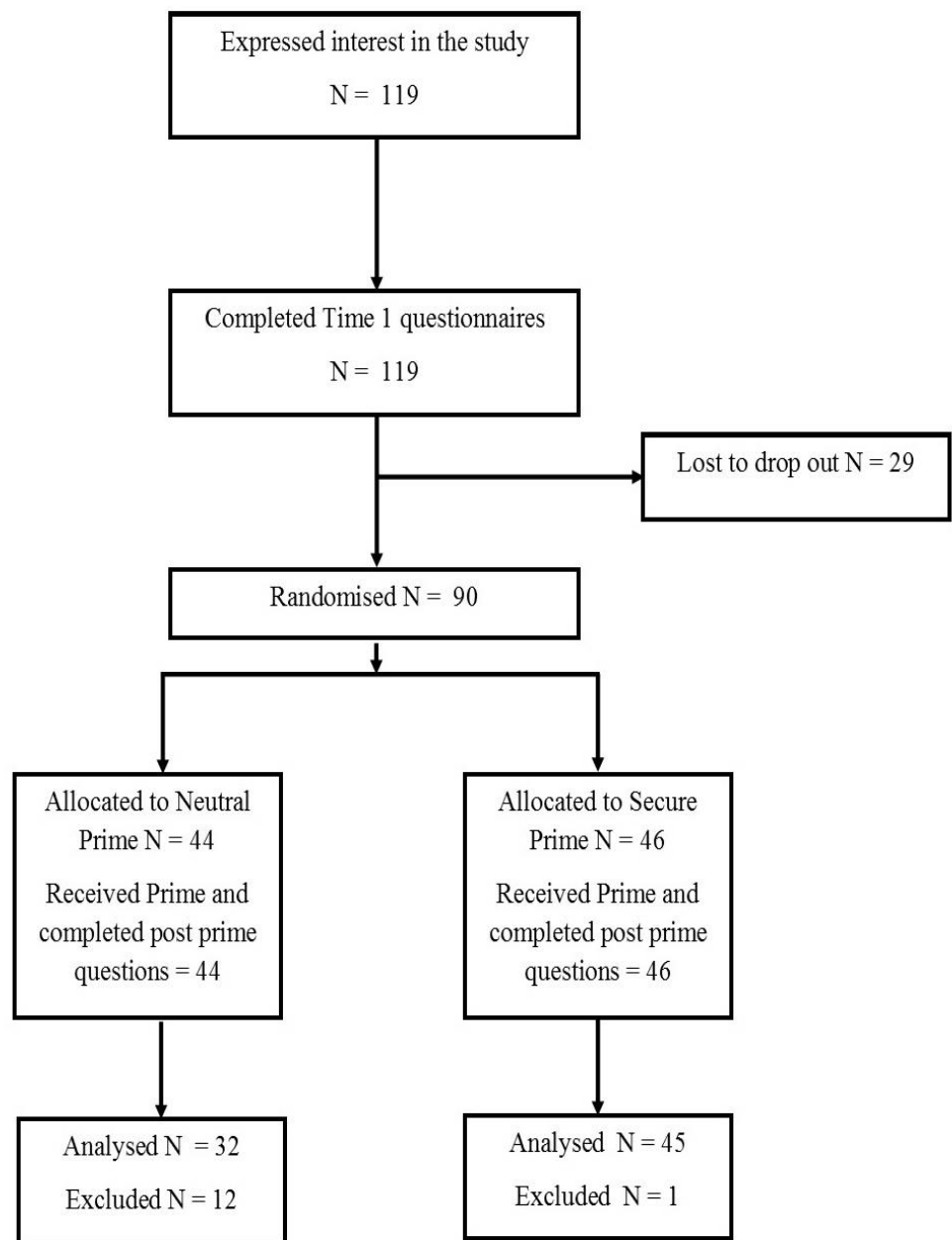


Figure 6.2: CONSORT diagram of participant flow through the study²⁴.

²⁴ Reasons for exclusion are reported in the 'manipulation check' section of the results.

Measures and materials

The Experiences in Close Relationships Scale – adapted (Brennan, Clark & Shaver, 1998). The Experiences in Close Relationships Scale (ECR) is a 36 item self – report measure of adult attachment and is reported in previous chapters. For the present results internal consistency was also good with $\alpha = .92$ for the anxiety subscale and $\alpha = .92$ for the avoidance subscale.

Patient Health Questionnaire for Depression and Anxiety 4 (PHQ – 4; Kroenke, Spitzer, Williams & Lowe, 2009). The PHQ – 4 is a brief anxiety and depression screening tool as described in Study 2b. In the present sample the PHQ – 4 showed good reliability with $\alpha = .86$ for the depression subscale and $\alpha = .83$ for the anxiety subscale.

Priming manipulation. The study used a supraliminal priming technique which has been successfully adapted from Bartz and Lydon (2004; Boag & Carnelley, 2012; Carnelley & Rowe, 2007; 2010; Mikulincer & Shaver, 2001; Rowe & Carnelley, 2003; Rowe et al., 2012). Participants allocated to the secure prime condition received instructions to think about a prototypically secure relationship and write about it for 10 minutes. Participants in the neutral prime condition were instructed to think about a routine food shop and write about it for 10 minutes. Full priming instructions are provided in Appendix M.

Manipulation check: The Felt Security Scale (Short Version, Luke, Sedikides, & Carnelley, 2012). In order to check the priming manipulation had created a sense of felt security, the short version of *The Felt Security Scale* (Luke, Sedikides & Carnelley, 2012) was used. *The Felt Security Scale* (Short) is a 10 item measure designed to assess feelings of felt security. Participants rated on a scale of 1 to 6 (1 = not at all, 6 = very much) how much comforted, secure, supported, safe, loved,

protected, better about themselves, encouraged, sheltered, and unthreatened thinking about the person in the visualisation task or thinking of the neutral scenario made them feel. Luke et al. (2012) report a high internal consistency for this measure ($\alpha = .96$). For the present study the Felt Security Scale also demonstrated a high internal consistency ($\alpha = .96$).

CCBT program: The Serenity Programme: The CCBT program chosen for use in this study was a free to access version of '*The Serenity Programme*' (www.serene.me.uk). The Serenity Program was chosen for use because of its level of interactivity and user friendly interface. It was judged to possess a good number of 'social cues' including the production of (gendered) human sounding voices and responses based on multiple inputs (Nass et al., 1994). The Serenity Program therefore provided a better platform with which to test the underlying theory (better internal validity) than Living Life to the Full. The program was written by Steve Cottrell, a Consultant Nurse Therapist for NHS Wales. The program itself is a nine module CBT treatment package and, having been subject to several research studies, is evidence based. The program all participants accessed in this study was a free version of the full program. The program (see Figures 6.3 and 6.4) has eight modules consisting of 12 steps each and the user can choose whether a male or female voice (or none at all) reads out the content. All participants were directed to complete the module '*Dealing with troubling feelings*'. This module consists of psychoeducation, such as a describing what emotions are, why we have them and 'emotional hygiene'. There is also a description of cognitive approaches to feelings of anxiety and behavioural components such as a 'grounding' exercise and promoting physical activity. Participants were provided with headphones to listen to the module.

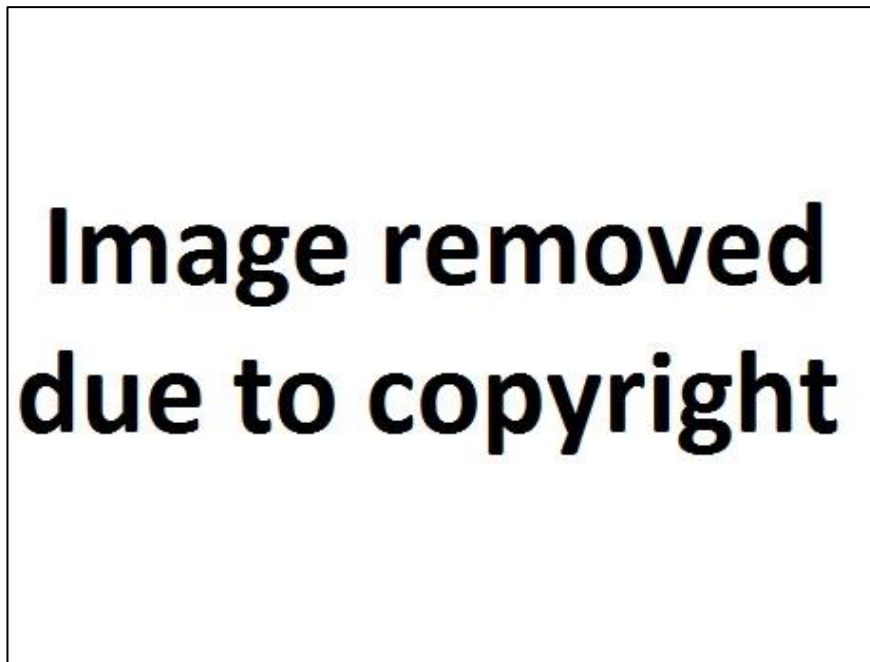


Figure 6.3. Screen shot of the Anxiety Programme main menu.

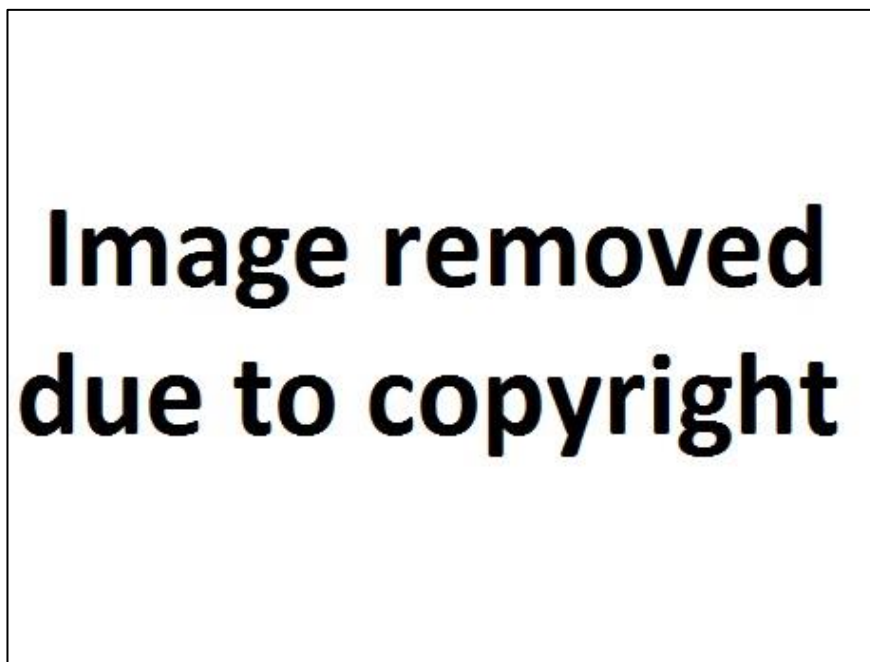


Figure 6.4. Screen shot of the module 'Dealing with troubling feelings'.

Working Alliance Inventory –adapted (WAI - SA) - short form, client version (Horvath & Greenberg, 1989; Revision Tracey & Kokotowitc 1989). The

WAI is a self-report questionnaire developed to assess the working alliance construct (Bordin, 1979) and is reported in Studies 2a and 2b. In the present sample reliability was generally good; $\alpha = .81$ (Task), $\alpha = .78$ (Bond), $\alpha = .68$ (Goal) and $\alpha = .90$ (Global).

Client Attachment to Therapist Scale - Secure subscale – adapted (CATS – SA; (Mallinckrodt, Gantt & Coble, 1995). The Client Attachment to Therapist Scale (CATS, Mallinckrodt et al., 1995) is a 36 item questionnaire developed to measure client reported attachment to their therapist. As in the previously reported studies, the secure subscale of the original CATS were adapted for use in this study. In the present sample the subscale demonstrated good reliability of $\alpha = .85$.

The User Engagement Scale – adapted (UES – A; O’Brien & Toms, 2010). The User Engagement Scale is a 31 item self-report questionnaire designed to measure user engagement with technology and is described in Studies 2a and 2b. All subscales in the present sample ranged from $\alpha = .8$ and $\alpha = .9$ and showed excellent reliability on the global scale $\alpha = .94$.

Social Presence Index – adapted (SPI – A; Lee & Nass 2003). Felt social presence in the program session was assessed using the Social Presence Index (Lee & Nass, 2003). Based on the Computers Are Social Actors (CASA; Nass et al., 1994) paradigm, the SPI is a four item scale measuring feeling of social presence. The original scale measured social presence within the context of a book buying website with participants listening to audio recordings of the book descriptions and reviews, therefore the wording of the scale was changed for the purposes of this study. The word "reviews" was changed to "the session". Participants respond on a 5 point Likert scale ranging from 1 (not at all) to 5 (very much). The index was highly reliable in Lee and Nass' original sample ($\alpha = .89$). The index demonstrated acceptable reliability in the present sample ($\alpha = .75$).

Procedure

This study consisted of two parts: part one was fully automated and completed online, whereas part two was conducted in laboratory settings.

Time one: The first part of the study was run entirely online, wherever participants chose. Participants signed up to the study using the University of Sussex SONA system, and logged on to Bristol Online Survey (BOS) to complete the pre priming questionnaires. These included demographic information, the ECR – A and PHQ – 4. Participants were instructed to book a time the following week to come to the lab and complete the second part of the study.

Time two: Participants were randomised to a secure or neutral condition by a true, online randomization process (www.randomizer.org) and run in the lab individually. Participants came to the lab and were given written and verbal instructions concerning the study procedure for part two and were asked to sign a consent form. The rest of the experiment was conducted online in the laboratory cubicle. Participants were logged onto a computer and presented with instructions for the priming manipulation. A text box on the screen allowed participants to freely type their thoughts and a countdown timer was provided on screen. Participants then completed the Felt Security Scale (short). Next, participants were instructed to complete one module of *The Serenity Programme* called *Dealing with troubling feelings*. Participants were told to decide whether to listen to a male or female voice. After the program module was completed, the following measures were administered; the CATS – SA, the WAI – SFA, the

UES – A and the SPI – A. Participants were then debriefed and thanked for their time.

Data analysis

Baseline data captured at time 1, including dispositional attachment anxiety and avoidance, was summarised and analysed for any significant differences between priming conditions. Although significance testing of baseline variables in randomised trials has been described as illogical²⁵ (Altman, 1985; Knol, Groenwald & Grobbee, 2012), differences between groups at baseline may be of concern only if they are related to the dependent variables (Altman, 1985). Independent samples t – tests were therefore conducted on the baseline data. If significant differences were evident, correlation analysis was deemed the most appropriate²⁶ to determine whether baseline variables and dependent variables were significantly related. If the baseline variables were not related to the dependent variables, these differences are not of practical concern for the main analysis (Altman, 1985). Therefore, if any significant differences were evident a correlation analysis was conducted to determine whether the baseline variables were significantly related to any of the dependant variables. It is understood that global attachment styles do not interact with attachment priming procedures and research typically shows dispositional attachment does not moderate attachment priming effects (Mikulincer & Shaver, 2007b, Gillath et al., 2008). If attachment anxiety or avoidance were significantly different between groups or related to the outcomes then a moderation analysis would be conducted.

²⁵ Significance testing assesses whether the observed difference occurred by chance, however, any significant differences between randomised groups must, by definition be due to chance.

²⁶ Some researchers use ANCOVA in order to ‘control’ for differences between groups at baseline however, when groups differ on the covariate, the treatment effect (IV) and covariate share common variance. The covariate and treatment effect are therefore confounded. The assumption of the independence of the covariate and treatment effect is broken and ANCOVA is untenable (Field, 2013; Miller & Chapman, 2001; Lord, 1967, 1969).

In order to assess the main effect of priming condition, multivariate analysis of variance (MANOVA) tests were employed. This was deemed appropriate because (a) repeated analysis of variance (ANOVA) tests on the same data increase the probability of a Type 1 error and (b) the outcomes can be grouped by theoretically and conceptually similar variables (that are also correlated with each other), making MANOVA analyses a tenable option (Field, 2013). As such two MANOVA tests were conducted with priming condition as the independent variable. Client attachment (CATS – SA) and working alliance (WAI – SF) were dependent variables for analysis one, social presence (SPI – A) and user engagement (UES – A) were dependent variables for analysis two. Each pair of dependent variables correlated with each other at the $p < .001$ level. If the main multivariate analysis was significant (at $p < .05$), univariate analysis were reported. Bias corrected accelerated confidence intervals were selected to produce bootstrapped confidence intervals (BCa 95% CI) in order to reduce any bias in the data (Field, 2013). These are reported in the square brackets throughout. Pillai's trace (V) was reported as it is the most robust to violations of assumptions (Field, 2013).

6.3. Results

Preliminary Analysis

Table 6.1 displays the demographic characteristics of the entire sample. Baseline data was analysed to determine whether differences existed between groups randomly allocated to either the secure or neutral prime. The secure prime condition contained more males ($N = 11$) than in the neutral prime condition ($N = 2$) and this mean difference, .18, [0.03, 0.34] was statistically significant, $t(71.87^{27}) = 2.33$, $p = .02$, $d = 0.72$ On average, people allocated to the neutral prime condition scored higher on

²⁷ Equal variances not assumed.

the anxiety dimension ($M = .26$, $S.D = 1.10$) than those in the secure prime condition group ($M = -.49$, $S.D = 1.05$). This mean difference, .23, [0.30, 1.20], was significant $t(75) = 2.78$, $p = .01$, $d = 0.62$. In accordance with the recommendations of Altman (1985) these baseline variables were analysed to determine whether they were significantly related to any of the dependent variables. A one – way (Gender; Male, Female) MANOVA demonstrated no significant influence of gender on the dependent variables; $V = 0.03$, $F(4, 72) = .54$, $p = .71$. Furthermore, bivariate correlation analysis demonstrated baseline attachment anxiety was not significantly related to any of the dependent variables (all p 's $< .05$). As such, these baseline differences are not of practical concern for the main analysis (Altman, 1985).

Manipulation check

An Independent samples t test was conducted to check whether the secure prime enhanced participants' sense of felt security compared to a neutral prime. Results indicated participants in the secure prime condition felt a higher sense of felt security post – prime ($M = 51.29$, $S.D = 8.29$) than did the neutral group ($M = 23.38$, $S.D = 10.61$) and that this difference, -27.91, [-31.41, -24.40] was significant $t(75) = -16.17$, $p < .001$, $d = 3.93$. This suggests the security priming manipulation worked as intended. Exclusion of participants was conducted based on whether their total felt security score fell outside the expected security parameters for the type of prime. This meant excluding participants in the neutral prime group who reported a sense of felt security, post neutral prime, which was higher than the average for the sample ($N = 12$). Participants were excluded from the secure prime group if they reported a mean felt

security score which was lower than the mean for the sample ($N = 1$), which would suggest that the secure prime did not work for this participant²⁸.

Table 6.1: Demographic characteristics of priming group, neutral group and overall sample.

Variable	Secure Prime Group ($N = 46$)		Neutral Prime Group ($N = 44$)		Total Sample ($N = 90$)	
	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%
Age						
<i>M (S.D)</i>	20.80	(3.46)	21.20	(3.84)	21.00	(3.63)
Gender						
Male	12	(26.1)	4	(9.1)	16	(17.8)
Female	34	(73.9)	40	(90.9)	74	(82.2)
Ethnicity						
White	40	(87.0)	34	(77.3)	74	(82.2)
Mixed	2	(4.3)	3	(6.8)	5	(5.6)
Black/Black British	0	(0.0)	2	(4.5)	2	(2.2)
Asian/Asian British	2	(4.3)	2	(4.5)	4	(4.4)
Chinese	2	(4.3)	3	(6.8)	5	(5.6)
Taking Medication						
Yes	2	(4.3)	5	(11.4)	7	(7.8)
No	44	(95.7)	39	(86.6)	83	(92)
PHQ – 4 Score						
<i>M (S.D)</i>	2.46	(2.64)	4.11	(3.59)	3.27	(3.23)
PHQ – 4 range.						
Normal	29	(63.0)	19	(43.2)	48	(53.3)
Mild	12	(26.1)	11	(25.0)	23	(25.6)
Moderate	3	(6.5)	9	(20.5)	12	(13.3)
Severe	2	(4.3)	5	(11.4)	7	(7.8)

The means and standard deviations for the average scores on each of the main dependent variables are presented in Table 6.2. This is presented as a total for the sample, the average for each priming condition and the maximum score possible for each scale. This information is provided to place the results in an appropriate context.

²⁸ The main analysis was conducted both with and without these excluded participants and on the whole there were no substantial differences in the trend of results.

Overall, participants in the secure prime condition yielded higher means on every dependent variable compared to the neutral prime and the sample total.

Table 6.2: Means and standard deviations on each main dependent variable for the total group, secure prime and neutral prime groups.

	<i>M</i> (S.D.) Total	<i>M</i> (S.D.) Secure	<i>M</i> (S.D.) Neutral	Maximum scale score
CATS – SA	45.23 (8.15)	47.78 (6.63)	44.66 (8.83)	78
WAI – SFA	38.14 (6.68)	39.60 (6.42)	37.09 (6.60)	60
SPI – A	10.74 (3.10)	11.69 (2.76)	9.41 (3.10)	20
UES – A	99.64 (18.14)	104.94 (14.42)	92.13 (20.30)	155

The main effect of Priming Condition

Client Attachment to program and Working Alliance. A one way (priming condition: secure, neutral) multivariate analysis of variance was conducted with two conceptually similar main outcomes as the dependent variables: CATS – SA and WAI – SA. Results indicated the secure prime condition yielded higher mean scores on the CATS – SA; $M = 47.78$, $S.D = 6.63$, [45.52, 50.04] than the neutral prime group; $M = 41.66$, $S.D = 8.83$, [38.97, 44.34]. The secure prime condition also yielded higher mean scores on the WAI –SA, $M = 39.60$, $S.D = 6.42$, [37.67, 41.53] than the neutral prime condition; $M = 36.09$, $S.D = 6.60$, [33.81, 38.38]. Results from the main analysis demonstrated a significant effect of priming condition on client attachment to the

program and working alliance: $V = 0.14$, $F(2, 74) = 5.96$, $p = .004$, $\eta^2_{\text{partial}} = .14$. This result indicates there was a significant difference between the secure and neutral priming groups on the CATS – SA and WAI – SA. Follow up univariate analysis demonstrated significant priming effects on both the CATS – SA ($F(1, 75) = 12.08$, $p = .001$, $\eta^2_{\text{partial}} = .14$) and the WAI – SA ($F(1, 75) = 5.45$, $p = .022$, $\eta^2_{\text{partial}} = .07$). These results are reported in Table 6.3. Overall, these results indicate priming condition had a significant influence on client attachment to the program and working alliance with the program. Specifically, secure priming enhanced feelings of a secure attachment and a better working alliance.

Social Presence and User Engagement. A one way (priming condition: secure, neutral) multivariate analysis of variance was conducted with two conceptually similar main outcomes as the dependent variables: SPI – A and UES – A. Results indicated the secure prime condition yielded higher mean scores on the SPI; $M = 11.69$, $S.D = 2.76$, [10.82, 12.55] than the neutral prime group; $M = 9.41$, $S.D = 3.10$, [8.38, 10.43]. The secure prime condition also yielded higher mean scores on the UES – A $M = 104.98$, $S.D = 14.42$, [99.90, 110.07] than the neutral prime condition; $M = 92.13$, $S.D = 20.30$, [86.10, 98.15]. There was a significant effect of priming condition on felt social presence and user engagement with the program, $V = 0.18$, $F(2, 74) = 7.88$, $p = .001$, $\eta^2_{\text{partial}} = .18$. Separate univariate analysis revealed a significant effect of priming condition on both social presence ($F(1, 75) = 11.54$, $p = .001$, $\eta^2_{\text{partial}} = .13$) and user engagement ($F(1, 75) = 10.57$, $p = .002$, $\eta^2_{\text{partial}} = .12$). These results are reported in Table 6.3. Overall, these results indicated priming condition had a significant influence on social presence and user engagement with the program. Secure priming enhanced feelings of a social presence and program engagement.

Table 6.3: Table displaying the results from two MANOVA analysis and subsequent univariate analysis assessing the influence of priming condition on the main dependent variables.

	<i>V</i>	<i>F (df)</i>	<i>η² partial</i>
CATS – SA & WAI – SA	0.14	$F(2, 74) = 5.96, p = .004^*$.14.
CATS – SA		$F(1, 75) = 12.08, p = .001^*$.14
WAI – SA		$F(1, 75) = 5.45, p = .022^*$.07
SPI – A & UES – A	0.18	$F(2, 74) = 7.88, p = .001^*$.18
SPI – A		$F(1, 75) = 11.54, p = .001^*$.13
UES – A		$F(1, 75) = 10.57, p = .002^*$.12

Note: MANOVA analyses are presented first then subsequent univariate analysis. * = significant at $p < .05$ level.

Moderation by global attachment

Baseline attachment anxiety and attachment avoidance were entered into a regression model with priming condition to assess whether global attachment dimensions measured at Time 1 influenced the dependent variables. Three moderation analysis showed attachment anxiety and avoidance did not significantly moderate the relationship between priming condition and scores on the working alliance, social presence or engagement. Neither the anxiety and avoidance dimensions, nor the

interaction terms were significant (all p 's $>.05$). Priming condition was the only significant contributor in each model (all p 's $<.05$).

For client attachment to the program, Step 1 accounted for 14% of the variance ($R^2 = .14$) and significantly predicted scores on the CATS –SA, $F(3, 73) = 4.00, p = .01$. Including the interaction terms in Step 2 increased the amount of variance accounted for to 24% ($R^2 = .24, R^2_{\text{change}} = .10$). This model also significantly predicted scores on the CATS –SA, $F(5, 71) = 4.45, p = .001$. Final model parameters (reported in Table 6.4) indicated priming condition made a significant contribution to the model: $\beta = .35, t = 3.15, p = .002$. The interaction effect of priming condition x attachment anxiety also significantly contributed to the model: $\beta = -.50, t = -3.00, p = .004$. To investigate this interaction, a simple slopes analysis was conducted. The main moderation analysis with priming condition entered as the independent variable (X) and attachment anxiety as the moderator (M) revealed priming condition significantly contributed to the model ($\beta = 6.76, t = 3.45, p = .001$) and there was a significant interaction effect ($\beta = -4.79, t = -2.63, p = .01$). However, attachment anxiety did not significantly contribute to the model; $\beta = .11, t = .13, p = .896$. Simple slopes analysis revealed that when global attachment anxiety is low, there was a significant, positive relationship between priming condition and CATS – SA, $b = 12.16, 95\% \text{ CI } [5.43, 18.88], t = 3.60, p = .001$. At the mean value of global attachment anxiety, there was also a significant, positive relationship between priming condition and CATS – SA; $b = 6.76, 95\% \text{ CI } [2.73, 10.79], t = 3.35, p = .001$. When global attachment anxiety was high, there was no significant relationship between priming condition and CATS – SA; $b = 1.36, 95\% \text{ CI } [-3.19, 5.91], t = .60, p = .552$. This is demonstrated in Figure 6.5 which shows CATS – SA scores are higher in the secure prime than the neutral prime for individuals scoring low and at the mean of attachment anxiety. For individuals high on attachment anxiety CATS –SA

scores were higher in the secure prime group compared to the neutral prime, however this difference was not statistically significant. Overall this suggests that security priming may not work to enhance feelings of a secure attachment to the program if the individual has high dispositional attachment anxiety.

Table 6.4: Linear model of predictors of CATS – SA scores with 95% bias corrected and accelerated confidence intervals reported in the parenthesis (based on 1000 bootstrap samples).

	<i>b</i>	<i>SE B</i>	β	<i>p</i>
Step 1				
Constant	41.67 (38.54, 44.76)	1.38		<i>p</i> =.000
Condition	6.16 (2.56, 10.04)	1.89	.38	<i>p</i> =.002
Anxiety	0.23 (-1.32, 1.74)	0.83	.03	<i>p</i> =.780
Avoidance	-0.32 (-1.95, 1.43)	0.82	-.04	<i>p</i> =.698
Step 2				
Constant	41.11 (37.98, 44.18)	1.33		<i>p</i> =.000
Condition	5.71 (2.25, 9.22)	1.81	.35	<i>p</i> =.002
Anxiety	2.94 (0.34, 6.64)	1.20	.41	<i>p</i> =.017
Avoidance	-0.34 (-3.08, 2.21)	1.13	-.05	<i>p</i> =.766
Condition x Anxiety interaction	-4.79 (-8.57, -2.09)	1.60	-.50	<i>p</i> =.004
Condition x Avoidance interaction	0.12 (-2.81, 3.39)	1.57	.01	<i>p</i> =.940

Note. $R^2 = .14$ for Step 1; $\Delta R^2 = .10$ for Step 2

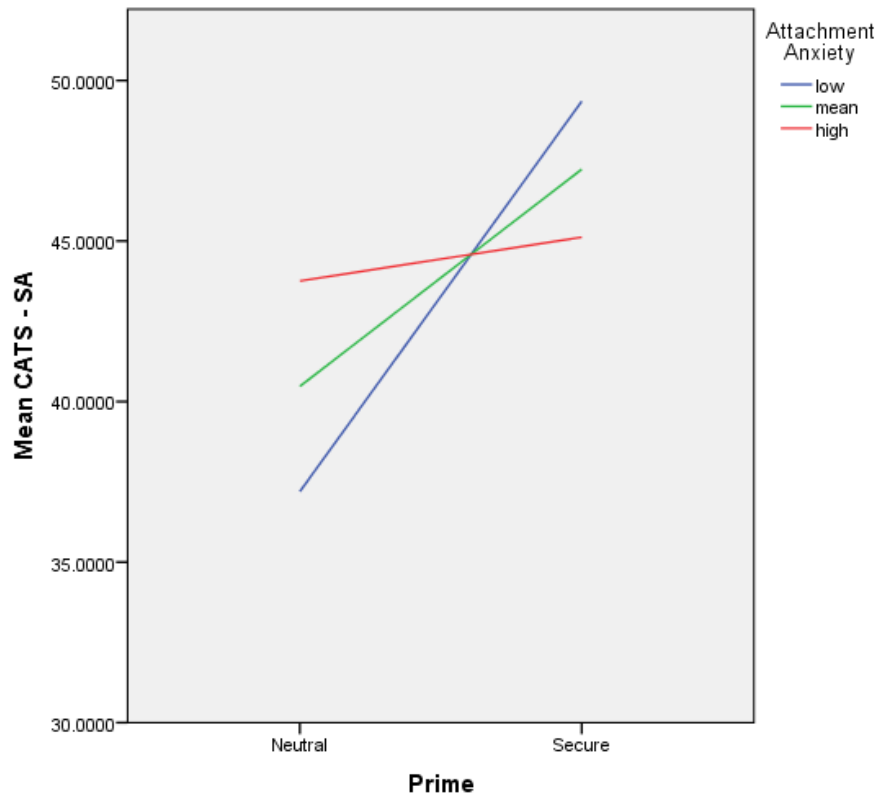


Figure 6.5. Simple slopes plot showing the interaction between priming condition and global attachment anxiety.

6.4. Discussion

This study was the first of its kind to investigate whether attachment security priming had a significant effect on engagement and alliance with online CCBT. Results demonstrated a statistically significant effect of security priming on attachment to the program, working alliance, felt social presence and user engagement. Specifically, participants in the security priming condition characterised their attachment to the program as more secure than participants in the neutral condition. This effect was moderated by baseline, dispositional attachment anxiety, whereby this effect was only significant for individuals ranging from low to the mean on the attachment anxiety dimension. A secure prime was also associated with higher ratings on the working

alliance, felt social presence within the program and program engagement compared to individuals in the neutral prime condition. Furthermore, these effects were not moderated by global attachment reported at Time 1. Overall these results demonstrate the beneficial effect of security priming on experiences with CCBT.

Program specific attachment

Results demonstrated a significant influence of security priming on user attachment to the program. Participants in the secure prime condition reported significantly higher means on the CATS – SA than those in the neutral prime condition and therefore demonstrated a more secure style of attachment with the program. The original CATS (Mallinckrodt et al., 1995) is designed to measure the client's feelings and attitudes towards their therapist from an attachment perspective. Mallinckrodt et al., (1995) report that individuals scoring high on the Secure subscale perceive their therapists as accepting, emotionally receptive and providing a secure base. The authors also report clients scoring highly on the secure subscale also tend to exhibit a good working alliance, a strong sense of self – efficacy and are high on dispositional attachment security. In the present study, security priming produced higher ratings of secure attachment to the program. Participants in the secure prime condition reported a mean CATS – SA score of 48. One sample *t* – tests showed this mean was significantly higher than the neutral midpoint for the scale. Conversely, individuals in the neutral prime condition reported a mean CATS – SA score of 44, which was not significantly different from the neutral midpoint. The mean CATS – SA score yielded from the secure prime group is also higher than that found in Study 3, in which participants attachment to an unguided CCBT program without any form of priming was 43 ($M = 42.62, S.D = 9.98$). Therefore, it appears security priming not only enhances feelings of a secure attachment to the program but boosts this attachment beyond a neutral point.

The adaptation to the CATS used in this study was simply to replace the words “ my counsellor” with “the program”, therefore it is tentatively suggested that a secure prime promotes a sense of the program as accepting, emotionally receptive and providing a secure base. However this effect was moderated by global attachment anxiety whereby individuals in the secure prime condition who were low (and within the mean for the scale) on attachment anxiety had the most secure attachment to the program. This suggests that although security priming enhances a secure attachment to unguided CCBT, this may not be the case for people high on global attachment anxiety, who appear somewhat resistant to the effects of the prime in this case. Further research should aim to replicate these results to determine whether security priming with the aim of boosting secure attachment to an unguided program is suitable for those high on attachment anxiety. These results suggest that not only is the concept of a secure attachment to an unguided CCBT program viable, but this attachment can be enhanced using security priming techniques. This study is the first to demonstrate individuals primed with a secure style of attachment are better able to form a secure style of attachment with an unguided CCBT program than those without such a prime.

Working alliance

The results of this study showed a significant effect of security priming on working alliance. The average rated working alliance was significantly higher after a secure prime than a neutral prime. This corroborates the study hypothesis which proposed secure priming would result in significantly higher ratings of the working alliance compared to a neutral prime. This finding is also consistent with the way that prototypically secure adults approach face to face therapeutic encounters. Chronically secure adults, with a positive view of the self and of others, tend to be better at forming collaborative, positive therapeutic alliances than insecure adults (Daniel, 2006; Smith et

al., 2010). The results of the present study demonstrate how these tendencies extend to therapeutic encounters within the context of unguided CCBT in which there is no human therapeutic contact. Importantly, the present results also demonstrate how, even if an individual has a chronically insecure attachment style, temporary activation of a secure base schema can bias responses to CCBT in a secure congruent fashion and promote better working alliance.

Where there are increasing numbers of studies investigating the role of the therapeutic alliance in guided CCBT programs (e.g. Andersson et al., 2012; Klein, Mitchell et al., 2009; Klein., 2010; Wagner, Brand, Schluz & Knaevelsrud, 2012), there is a paucity of research investigating the role of the therapeutic alliance in unguided online CCBT. One previous study investigating the working alliance in unguided CCBT (BTB) compared to email CBT (eCBT) showed that Goal and Task elements of the alliance were present in both groups at a similar level, however the Bond element of the alliance was greater in the eCBT group (Richards et al., 2013). Richards et al. report high levels of attrition from both groups (only 20% completed all eight sessions) however there was no significant difference in attrition between groups and no analysis was provided to determine whether alliance scores were associated with attrition. Richards et al. (2013) conclude that self - administered treatments delivered to University students can be a successful treatment format. The present results partially replicate the results of Richards et al. (2013) by demonstrating a working alliance is achievable in the context of unguided CCBT.

Social Presence

There was a significant effect of priming condition on felt social presence in that participants in the secure prime condition reported significantly higher levels of social presence than those in the neutral prime group. Security priming therefore advanced the

sense of social presence within the program. In the field of HCI, social presence refers to “the sense that other intelligent beings interact with you, even if those beings are non – human and only seem intelligent” (Lee & Nass, 2003, pp 289). Social presence is embedded within the Computers are social actors framework which shows the human – computer relationship is fundamentally social, that human beings apply social rules and expectations to computers even though they appreciate computers do not possess feelings (Nass et al., 1994; Nass & Moon, 2000). The Serenity program used in the current study presents a main menu from which the user can choose a module to work through. Each module presents information in a sequential order, accompanied by colourful graphics, interactive activities and a male or female voice over, depending on the preference of the user. As such the program consists of all the fundamental features of media that elicit social responses (language, interactivity and voice; Nass & Moon, 2000).

It is possible that the participants in this study were applying social rules and expectations to the Serenity program, which in turn influenced felt social presence. Evidence from security priming research shows people who are securely primed demonstrate more positive interpersonal expectations (Rowe & Carnelley, 2003). Participants primed with a secure attachment in the present study may then have felt more positive about their expectations of the program and their interaction with it. Individuals high in attachment security also tend to be more cognitively open to new information (Hazan & Shaver, 1987; Mikulincer, 1997; Mikulincer & Arad, 1999). The findings of the present study may therefore also represent a general cognitive openness to experiencing the features of the program which elicit a social response. However, given the overall average ratings of social presence were not particularly positive or

negative the author cannot be confident in this explanation without further study replication.

User engagement

There was a significant main effect of priming condition on program engagement whereby security priming significantly improved user reported engagement with the program compared to a neutral prime. Furthermore, participants in the secure prime condition reported a level of program engagement which was significantly higher than the neutral midpoint for the UES. Reported program engagement in the neutral prime group did not significantly differ from a neutral point. Security priming therefore offers a novel way to improve program engagement with unguided online CCBT. Security priming resulted in participants feeling more absorbed in the program (focused attention), having more positive emotions towards the program and finding it less cognitively taxing (perceived usability). Participants in the security prime condition also found the program more aesthetically pleasing (aesthetics), reported higher levels of curiosity to explore the program further (novelty), found the program worthwhile (endurability) and were more drawn into the program content (felt involvement).

These results extend evidence from previous attachment priming research which has demonstrated an association between security priming and positive evaluations of novel stimuli (Banse, 1999; Mikulincer et al., 2001). To investigate the role of security priming on evaluations of novel stimuli Banse (1999) subliminally presented representations of participants' romantic partners and then presented neutral Chinese ideographs. Results showed Chinese ideographs were evaluated significantly more positively in the secure prime condition compared to a neutral prime. These results were extended by Mikulincer et al. (2001) in which securely primed participants reported significantly more positive evaluations of neutral stimuli compared to a neutral prime,

even under stressful conditions. Furthermore priming of positive, attachment – unrelated representations did not produce such effects. These findings are therefore attributable to activation of an attachment related, secure base schema and not from the positive affect produced by non – attachment related sources. The authors of these studies explain these effects in social – cognitive terms; the contextual activation of a secure base schema increases the accessibility of positive affect, leading to a “spill over” of this affect onto unrelated stimuli (Mikulincer et al., 2001).

While this evidence does not pertain to engagement per se it does offer a framework in which to explain the results of the present study; security priming temporarily activates a secure base schema which heightens the cognitive accessibility of positive affect (felt security), which in turn positively biases judgements and evaluations of novel stimuli (the program). These positively biased cognitions facilitate the ease of program engagement. Additionally, securely primed participants may appear more able to engage with the program because security priming lowers attachment characteristic defences which prevent meaningful engagement with traditional therapies (Arndt et al., 2002; Daniel, 2006; Gillath et al., 2008; Shaver, Mikulincer, Lavy, & Cassidy, 2009). Security priming therefore offers a unique way to enhance engagement with unguided online CCBT.

Limitations

While the results of this study are encouraging they should be viewed in regard to the following limitations. The priming procedure was supraliminal, which may have induced demand characteristics. However the priming procedure was run under the guise of a visualisation task and this priming technique has been successfully implemented in previous research (Bartz & Lydon, 2004; Boag & Carnelley, 2012; Carnelley & Rowe, 2010; Rowe & Carnelley, 2003; Rowe et al., 2012; Wilkinson,

Rowe & Heath, 2013). Moreover, due to the logistical demands of subliminal security priming (e.g. presentation of pictures at a precise number of milliseconds, specific software used to present stimuli, specific viewing distance), subliminal techniques may not be feasible for widespread implementation with CCBT. That being said, asking people to visualise and write about a secure relationship for 10 minutes may not be the most convenient way to securely prime CCBT program users. While this technique has provided sufficient evidence to propose security priming has beneficial effects on program engagement and alliance, further research should investigate whether briefer priming techniques produce the same benefits.

To make firm conclusions regarding how the security priming can influence the whole therapeutic process in this context a longer study is required running the full length of a program. This study asked participants to complete one module of the program, which represents the beginning phase of the therapeutic process. Therapy is understood to be a phased process comprising of a beginning phase in which the alliance is developed (focus of this study), a middle phase in which the therapeutic work is undertaken and an end phase in which therapeutic gains are reinforced and the alliance is concluded (Eames & Roth, 2000; Tracey, 1987, 1993). Evidence suggests early ratings of alliance are more predictive of attrition and outcomes compared to the mid and end phases (Horvath & Symonds, 1991; Piper et al., 1991) and so security priming may be most relevant to this phase of the process. Further studies spanning the whole program length and exploring the role of security priming on the mid and end phases of the alliance as well as a potential way to repair ruptures would be beneficial. This would also allow an insight into whether program attrition and completion (behavioural measures of engagement) correlate with the UES (a cognitive measure of

engagement). Nevertheless, this study provides a good foundation for further exploration of the role of security priming in unguided online CCBT.

These results require replication across different unguided CCBT programs for varying types of CMHDs. The present study used a program which looked aesthetically pleasing, had elements of interaction and allowed users to choose the gender of the program voice over. However, not all programs are created equal with equal amounts of ‘common factors’ and alliance features built in. A recent qualitative analysis demonstrated how programs vary in the degree that automated alliance features are incorporated into program design (Barazzone et al., 2012). It is likely that programs lacking in alliance features and ‘common factors’ result in higher attrition rates (Cavanagh et al., 2013) which may not be overcome by security priming alone.

Questions may arise as to the generalisability of these results to a clinical population given the present study was based on a sample of university students. However, the PHQ – 4 was used to account for the level of mental distress (in reference to depression and anxiety only) in the current sample. It is worth noting that almost half (47%) of the study sample were experiencing symptoms of depression and anxiety ranging from mild to severe as measured by the PHQ – 4. Overall, university students represent a unique group in which financial pressures, developmental changes, life changes and academic pressures can result in a high risk of developing mental health disorders (RCP, 2011).

Implications for theory

These results have several important implications both in the field of attachment theory and CCBT. Given the concern of some professionals that CCBT programs fail to provide clients with a therapeutic alliance which is essential for beneficial outcomes (Helgadóttir et al., 2009), it is interesting that participants in the present study

responded to the program in a manner that is evident in human therapist interactions. That is, individuals with a secure attachment style (albeit temporarily primed) were more open to building a secure attachment, a working alliance and were better able to engage with the program. This is consistent with meta -analyses which demonstrate secure attachment is associated with a better alliance with face to face therapists (Bernecker et al., 2014; Diener & Monroe, 2011). It is also consistent with primary studies which illustrate how more secure individuals are more compliant and more emotionally committed to treatment (Dozier, 1990; Korfmacher et al., 1997). The results of the present study therefore suggest (1) at least some of the variance in responses to CCBT can be predicted by ascertaining the attachment orientation of a program user and (2) responses to CCBT can be influenced to be consistent with how highly secure individuals typically respond to human therapists. This generates some significant implications.

Security priming has been shown to have many positive effects including reducing attachment related defences (Arndt et al., 2002; Shaver et al., 2009), increasing positive affect (Mikulincer et al., 2009), promoting altruism (Mikulincer et al., 2005) and reducing negative reactions to out – groups (Mikulincer & Shaver, 2001) to name a few. Security priming is shown to influence such a diverse number of variables (Gillath et al., 2008), however this represents the first known study to demonstrate how security priming can enhance both the program specific attachment, working alliance and engagement, with unguided online CCBT. More broadly this study represents the first time security priming has been applied to a therapeutic context. It is proposed that temporary activation of the secure base schema positively biased information processing in a secure – congruent fashion. Securely primed participants, working with an enhanced sense of felt security, felt safe to explore this new online environment and

were open to exploring new information. Consequentially, this would facilitate the formation of a more secure attachment, better working alliance and make program engagement easier. This is consistent with the idea that individuals high on attachment security, with the benefit of a “secure base” are comfortable exploring new environments (Bowlby, 1973) and demonstrate more cognitive openness to new information (Mikulincer, 1997; Mikulincer & Arad, 1999). Securely primed participants may have also experienced more positive self – views (Carnelley & Rowe, 2007) which may in turn promote a sense of self – efficacy, a confidence in being able to complete the program unassisted.

This also raises implications for the way the therapeutic relationship is conceptualised in unguided pure self-help approaches. For guided programs the therapeutic relationship may be composed of a ‘triangle of alliance’ between the program user, the CCBT program and the program supporter (Cavanagh, 2010). However in the absence of human therapeutic contact, what are program users aligning with and attaching to? The working alliance and program specific attachment were measured “towards the program”, not towards the program authors or designers. The wording of the measures were explicitly chosen for this purpose. Therefore the study participants must have been aligning with and attaching to the program itself and the features of the therapeutic alliance embedded in the program. This reflects a user – program dyad of alliance which composes of shared goals, agreement on therapeutic tasks and an element of trust, acceptance and confidence in the program, i.e. bonds (Bordin, 1976). How is it possible to create a positive alliance with a program and even rate one’s relationship with a program as prototypically secure?

As described in the previous chapter, it is proposed that participants are treating the program as a social actor (in accordance with the computers are social actors theory;

Nass et al., 1994) and so the study participants were unconsciously applying social rules and attitudes to the program and that this process was influenced by security priming. Previous research supporting this proposition includes that of Kaplan, Farzanfar and Friedman (2003) who present a qualitative study of user experiences with an automated telephony based health behaviour change system. Users described the system in anthropomorphic terms (by using personal pronouns). System users also described the technology as if they were experiencing a personal relationship with it (describing it as a “friend” or “mentor”) and appeared to want to interact with it only when they had met the desired behavioural goals set by the system. Nass et al. (1994) also present results illustrating participants rated a computer referred to as “the programmer” was rated less likable, less capable and more difficult to use than the same computer referred to as “the computer”. Both these studies lend support to the idea that computer users feel like they are interacting and relating with a computer, not a programmer.

In unguided online CCBT, human – human therapeutic interaction is essentially replaced by HCI. It is within this framework that the therapeutic content and therapeutic alliance features are communicated. Perhaps future research should explore whether a cumulative effect of applying social rules to computers (Nass et al., 1994) and embedded alliance features (Barazzzone et al., 2012; Cahill et al., 2008; Peck, 2010) prompts program users to build an alliance with the program and attach to the program in a way they may do with a human therapist. That is not to say human – computer interactions are the same as human interactions, however the CASA paradigm makes it understandable how program users may apply attachment style congruent social rules, expectations and attitudes to CCBT programs.

Implications for research

The results of the present study demonstrate a positive effect of security priming on engagement and alliance with one session of CCBT, but how long do these effects last for? The effects of one off security priming conducted in laboratory settings tend to be short lived (Joordens & Becker, 1997; Versace & Nevers, 2003), however a body of research is now accumulating that demonstrates repeated security priming maintains these positive effects (Carnelley & Rowe, 2007; Gillath & Shaver, 2007; Otway, Carnelley & Rowe, 2014). Perhaps repeated online priming would continue to build on and strengthen these positive outcomes. As one focus of therapy is for the provision of a secure base for exploration (Bowlby, 1988), security priming techniques may be of particular relevance to unguided CCBT in which no human therapeutic support is supplied. Repeated security priming may enhance the feeling of the program providing a safe base for self-exploration.

The present study focused solely on how security priming influences metrics of engagement and alliance and therefore measures of symptom improvement were not included in this study. Further research should investigate how increasing engagement and alliance via security priming may benefit therapeutic outcomes. The idea is that the more people engage with a program and build a strong alliance, the less resistance and more exposure they have to the therapeutic content resulting in better therapeutic outcomes. A randomised controlled trial incorporating a control group (no prime), a secure prime and a neutral prime group running for the length of an entire program would be advantageous.

These results also present a compelling case for exploring how enhancing the relational aspects of unguided CCBT programs may increase engagement and alliance. Participants in this study aligned and engaged with the program in an attachment

congruent manner even though the program itself only consisted of a voice – over and interactive slides. Future research may investigate how to boost engagement and alliance even further with the use of computational artefacts designed to build and maintain long term social – emotional relationships with users (relational agents: Bickmore & Picard, 2005). Relational agents are designed to simulate face to face conversations and are modelled after human interpersonal interactions that promote a sense of rapport, trust and working alliances (Bickmore & Gruber, 2010). Evidence suggests these embodied conversational agents are rated highly on the therapeutic alliance, ease of use and likability in depressed individuals (Bickmore et al., 2010). Despite these promising beginnings, the use of relational agents in healthcare applications is limited (Bickmore & Gruber, 2010) and virtually non-existent in the field of CCBT. Future studies may explore how combining security priming with technology such as relational agents may yield optimum levels of engagement and alliance with unguided programs.

Implications for practice

Evidence suggests the number of students requiring mental health services has significantly increased in recent years (Grant, 2011). As with the general population there is an increasing need to manage student mental health in a clinically and cost effective fashion. Given university counselling services are essentially the primary care mental health option for students (RCP, 2011), unguided CCBT programs may have a particular role to play in the management of distress in students. Results from the present study suggest a therapeutic alliance and engagement is achievable with unguided CCBT programs and this can be enhanced by use of online security priming. As such, with the aid of security priming, unguided CCBT programs may provide an acceptable treatment option for students who wish to remain anonymous (Day, McGrath

& Wojtowicz, 2013), students who would otherwise not engage with mental health services or students on a waiting list to see a counsellor.

Conclusions

The present study demonstrated how contextual activation of a secure base schema, via online supraliminal security priming, positively influenced responses to unguided online CBT for anxiety. Specifically, securely primed participants demonstrated more secure program attachment, better working alliance, higher levels of program engagement and a better sense of social presence compared to a neutral prime. Consistent with the spreading activation theory of security priming (Anderson, 1994; Collins & Loftus, 1975) it is proposed that temporary domination of the internal working model by a secure base schema positively biased information processing, which in turn facilitated program engagement and permitted a more secure style of attachment to be developed with the program. These findings are also consistent with how adult attachment styles influence engagement and alliance with traditional therapies (Dozier, 1990). Overall these results provide evidence that incorporating online security priming into unguided CCBT may help to reduce the problem of attrition (Eysenbach, 2005) in unguided CCBT. Furthermore, “security priming enhanced” unguided CCBT may be of particular help in meeting the needs of an increasing number of students experiencing mental health difficulties (RCP, 2011) who may otherwise be difficult to reach or cannot access traditional services.

Chapter 7: General discussion

The overarching aim of this body of work is to provide a unique insight into the factors influencing engagement with computerised cognitive behavioural therapy for common mental health disorders. The work presented therefore provides a novel exploration of how the implementation issues surrounding CCBT may be reduced, with a focus on client related variables and the role of adult attachment styles. The reviews and empirical work presented raise several key findings of interest. The main findings from each study will be briefly outlined and the implications for theory, future research and practice discussed.

7.1. Summary of main results

Meta – analysis. This meta-analysis aimed to assess the effectiveness of CCBT as a low intensity psychological intervention for the treatment of CMHDs and used sub – group analysis to determine whether any measured person, problem, program or provider characteristics (Cavanagh & Millings, 2013b) significantly moderated this effect. Forty – nine RCTs yielded an overall effect size of $g = 0.77$, 95% CI [0.59 to 0.95], in favour of CCBT interventions. The mean age of study participants was found to be negatively related to the effectiveness of CCBT. Effect sizes did not differ between guided and unguided programs and overall no other measured variables significantly moderated the effectiveness of CCBT. Methodological quality varied between studies but was adequate and risk of bias did not significantly moderate effect sizes. However, other moderators of effectiveness may be apparent in real world dissemination which were not measured in this analysis or this analysis was underpowered to detect. Overall, this analysis demonstrates CCBT can be an effective intervention for CMHDs and this does not differ according to the amount of support provided.

Systematic review of engagement. This review aimed to systematically explore the ‘Four P’ factors (Person, Problem, Program, Provider; Cavanagh and Millings, 2013b) which are associated with CCBT program uptake and completion. Thirty seven trials met the review criteria and results show use of psychotropic medication is positively associated with program uptake and completion. The mean age of study participants is negatively associated with treatment completion. Studies using CCBT programs for anxiety disorders are associated with higher rates of treatment completion. CCBT uptake and completion are not significantly related to any other measured variables and do not differ between guided and unguided programs. The included studies varied in methodological robustness and quality of reporting engagement metrics. Studies differed in their reporting of certain descriptive variables such as medication use and treatment history, therefore this analysis may be underpowered and the conclusions should be viewed with this in mind. Together, these results illustrate the potential benefit of dual – modality treatment in CCBT engagement and highlights the need to consider patient age and type of CMHD in treatment completion. Furthermore, reported uptake and completion rates are consistent with previous reviews illustrating that CCBT uptake is low but CCBT completion is in the range seen in face to face therapies (Kaltenthaler, Sutcliffe et al., 2008; Waller & Gillbody, 2009).

Study 1. The first empirical study aimed to explore the acceptability of CCBT in a student population and investigate whether acceptability was associated with client variables such as age, gender and adult attachment. Results demonstrated the acceptability of CCBT is generally good and attitudes towards using CCBT for depression are positive in this population. Although, credibility and expectancy ratings are low, indicating study participants remained unconvinced that CCBT is a credible treatment option that would bring about significant improvement in depressive

symptoms. Participant age is the only demographic variable associated with acceptability of CCBT. As age increases, acceptability of CCBT decreases. It is worth noting however, the effect size ($r = -.17$) represents a small effect. Contrary to the study hypothesis, adult attachment styles are not significantly associated with any indicators of CCBT acceptability. As this study was designed to reflect real world CCBT dissemination the methodology possessed good ecological validity, however this design necessitated no explicit inclusion criteria for participation and as the sample were a higher education student population the results may be generalised to clinical populations with caution.

Study 2a. The second empirical study aimed to explore whether the adult attachment styles were associated with the therapeutic alliance and engagement with a guided CCBT program in vivo. Results indicated no attachment dimensions significantly predicted the program specific attachment, the quality of the working alliance or engagement with the program. This finding is contrary to the study hypotheses and does not mirror what is expected from the main body of traditional psychotherapy literature. Although the study was designed to reflect real world deployments of guided CCBT, the measures employed may not have accurately captured the ‘triangle of alliance’ (Cavanagh, 2010) between the program users, the program and program supporter and so future research should aim to explore these associations further. Overall these results imply that the associations between adult attachment and traditional therapy may not simply translate to guided CCBT contexts and consideration needs to be given to the relative importance of each interaction in the ‘triangle of alliance’.

Study 2b. This study aimed to explore whether the adult attachment styles were associated with the therapeutic alliance and engagement with an unguided CCBT

program in vivo. Significant interaction effects of attachment anxiety and avoidance highlighted the role of fearful – avoidant attachment styles in impeding the formation of good quality therapeutic alliances and engagement with CCBT. As attachment anxiety and avoidance increase, secure client attachment to the program, the quality of therapeutic alliances and engagement decrease in a linear fashion. Conversely, highly secure individuals report better working alliances and better program engagement. These findings mirror the relationship between dispositional attachment styles and traditional therapy, supporting the study hypothesis. Furthermore it is proposed that the absence of human support may act as a threat related prime which activates the adult attachment system and so produces these effects. This study possessed high external validity and an adequate sample size which generate confidence in these findings, however the results must be interpreted in view of limitations including the inability to control for extraneous variables. Overall, the results suggest the relationships between dispositional attachment, therapeutic alliances and engagement in traditional therapy extend to the solely human – computer interactions of unguided CCBT.

Study 3. This randomised, experimental study aimed to determine whether attachment security priming would override participants' dispositional attachment styles and facilitate them to respond to unguided CCBT in a fashion consistent with highly secure individuals in Study 2b. Results show that priming a sense of felt security produce significantly higher levels of program engagement and better working alliances compared to neutral primes. Furthermore these effects are largely unmoderated by dispositional attachment styles (apart from with regards to secure client attachment to the program), meaning security priming may be particularly useful as a technique to enhance engagement and working alliances with CCBT programs. This study benefits from a randomised design and strict experimental control which improves the internal

validity of this study. However, further research with naturalistic, observational designs may be needed to determine the external validity of these findings. Overall these findings suggest contextually priming a sense of felt security significantly improves the quality of therapeutic alliances and engagement with unguided CCBT.

7.2. Implications for theory

These findings hold several significant, unique contributions to theory, specifically regarding the therapeutic alliance, attachment theory, “computers are social actors” theory and the process – based model of engagement.

The therapeutic alliance in CCBT. Traditional psychotherapy research places great emphasis on the role of common factors, and specifically the therapeutic relationship, in generating successful therapeutic outcomes (Lambert & Barley, 2002; Lambert & Ogles, 2003). By virtue of the reduction or complete absence of human therapeutic support, concerns have been raised that self – help approaches and CCBT fail to embody these common factors and this will be a detriment to the effectiveness of these interventions (Helgadóttir et al., 2009). An important question for advancing the field of CCBT is whether the therapeutic relationship exists in this context and if so, how it differs from that of therapist delivered CBT (Cavanagh & Shapiro, 2004; Gega et al., 2013). Preliminary evidence suggests CCBT programs do include various common factors which are designed as fully automated features of the program (Barazzzone et al., 2012) and these features can be experienced by users (Ormrod et al., 2010).

Results from the present studies suggest that the idea of developing a therapeutic alliance with CCBT does have face validity for program users. By using an adapted version of the Working Alliance Inventory (Horvath & Greenberg, 1989, Tracey & Kokotovic, 1989) across three different programs (Beating the Blues, Living Life to the Full and The Serenity Program) all participants were able to rate their working alliance

with the program to varying degrees. Considerable variation existed between programs on ratings of the working alliance. Users of Beating the Blues rated the working alliance as significantly lower than the neutral midpoint on the WAI – SA ($t(148) = -2.07, p = .04$) and users of Living Life to the Full rated the working alliance as no different to the neutral midpoint ($t(174) = 1.15, p = .25$). For users of the Serenity Program, participants in the neutral prime condition again did not rate working alliances as higher than neutral ($t(43) = 1.77, p = .08$). However, participants exposed to a secure prime reported working alliances significantly higher than neutral ($t(45) = 3.94, p < .001$). Therefore, although the idea of a working alliance has face validity for program users, the average rated quality of this alliance in unprimed contexts is low. This is consistent with previous research which has shown that although therapeutic alliances can be formed with CCBT programs, they tend to be weaker than those evidenced in face to face therapies (Gega et al., 2013; Ormrod et al., 2010).

In contrast to the traditional view of therapeutic relationships, Peck (2010) proposed that the client – therapist relationship may be a channel through which common and specific factors are ‘transmitted’. This channel may either facilitate or hinder this transmission. In CCBT no such human channel exists and so these specific and common factors are built into programs. Furthermore, Peck (2010) argued that there is no human therapist in CCBT therefore the transmission of common factors can occur in a standardised, immediate fashion without hindrance. This is an optimistic hypothesis and one that is not fully supported by the results of this thesis. The poor alliance ratings evidenced in these studies would suggest that currently, CCBT is not an entirely effective channel for common factors, or there simply needs to be more common features embedded in these programs. Either way, future efforts are needed to improve the relational aspects of these programs. That being said, the results from Study 3

indicating alliance ratings were significantly better than neutral after security priming show that there is potential for the relational aspects of CCBT to be enhanced.

Finally, when considering the nature of the therapeutic alliance in CCBT it is essential to consider what people are actually ‘relating’ to. It may feel more comfortable to view the therapeutic relationship in CCBT as one that develops with another human entity – say the program author or designer. However the wording of the WAI in these studies was specifically changed from ‘my counsellor’ to ‘the program’. Therefore participants were rating their alliance with the program itself and not any entity ‘behind’ the program such as the program author. This is crucial as it demonstrates program users are viewing the program as a social and relational entity (to an extent) in itself. This is consistent with the computers are social actors theory (Nass et al., 1994) which provides evidence that computer users respond socially to computers and do not see computers as a medium for social interaction with the computer programmer (Sethuraman, 1993). In a similar vein, users of CCBT programs are building alliances (albeit weak ones) with CCBT programs and not the authors of the program or the program designers. Given the majority of the studies in this thesis utilised unguided programs, these conclusions can currently only be applied to these unsupported interventions. When considering the ‘triangle of alliance’ between the program, the program user and the program supporter (Cavanagh, 2010), it may be helpful to assess the relative strength and importance of each interaction on therapeutic outcomes and engagement. However, the results presented suggest the human – computer alliance is an important area for consideration and advocates that the human – computer interaction element of CCBT deserves more attention than is currently being paid in the field.

Attachment theory and CCBT. Adult attachment theory traditionally concerns the way internalised experiences with attachment figures in infancy (Bowlby, 1973) influence the way human beings approach close interpersonal relationships with other human beings (Ainsworth, 1989). The principles of attachment theory have been applied to the field of traditional, face to face psychotherapy and research consistently shows an association between adult attachment styles and the way people approach and make use of psychotherapies (Daniel, 2006; Dozier, 1990; Smith et al., 2010).

Attachment security is associated with the ability to form good therapeutic alliances and higher treatment compliance. Conversely, attachment insecurity tends to be associated with an unwillingness to accept help and avoidance of emotional intimacy (if highly avoidant) and/or being constantly preoccupied with maintaining the therapeutic relationship (if highly anxious). Insecure attachments therefore produce anxious and/or avoidant tendencies that disrupt the formation of a good quality therapeutic alliance (Smith et al., 2010).

The results from this thesis, in particular Studies 2b and 3, demonstrate how these attachment ‘tendencies’ extend their influence beyond the intimate client – therapist interactions of traditional psychotherapy to human – computer interactions in which computer programs fulfil the role of a human therapist. When using an unguided program, high attachment security was associated with higher ratings of the quality of the therapeutic alliance and better program engagement (converse being true for highly insecure attachment). As such these results signify a distinctive contribution to theory. Authors have previously suggested that individual differences in attachment styles may influence engagement in e – mental health (Cavanagh & Millings, 2013a, 2013b). The work presented in this thesis tends to corroborate this proposition, particularly in the case of unguided programs.

Evidence from Study 2b suggests that based on their dispositional attachment styles, human beings may respond to unguided CCBT programs with the same tendencies they display towards human therapists. In particular there is something intrinsic about individuals who are both highly anxious and highly avoidant (fearful – avoidant according to Bartholomew’s prototypes) that impedes the ability to form therapeutic alliances and engage with CCBT programs. This finding essentially mirrors the relationship between fearful – avoidant attachment and the use of traditional psychotherapy.

For guided CCBT however, these associations were not supported by the results of Study 2a. Methodological issues may have influenced the pattern of results. For example, participants were run in large groups simultaneously which may have in turn created a number of human ‘primes’ within the room which may have overridden the CCBT effects. It is possible the failure to find any significant associations was because the measures employed did not account for each aspect of the ‘triangle of alliance’ (Cavanagh, 2010). The adapted measures assessed alliance and engagement towards the program (the human – computer interaction) but did not adequately measure the interactions between the participants and the program supporter (the human – supporter interaction). When considering the relative salience of each interaction it is probable that the human – supporter interaction attracted the attachment tendencies rather than the CCBT program itself, however this aspect of the alliance was not captured by the adapted measures. This highlights an issue with construct validity in this study which may be addressed in future research.

I propose a theoretical model which would account for the differences in results seen between guided and unguided programs. Specifically, for unguided CCBT programs the absence of human support acts as a threat – related prime which triggers

the activation of the adult attachment system, particularly for individuals high on attachment insecurity. Fearful – avoidant individuals desire to seek reassurance from another human being, have little belief in their abilities to self – manage their therapeutic process and possess an internal working model which is inadequately organised to provide a reliable strategy for dealing with distress (Hunter & Maunder, 2001). As such, highly insecure program users become hyper – aware of the absence of a human therapist, which in turn triggers the activation of the adult attachment system. Conversely, the absence of therapeutic support in CCBT does not cause alarm to the highly secure individual, who holds a positive view of the self and others, has faith in their abilities to self – manage their therapeutic process and can comfortably seek support from close others if needed. This model provides a theoretical framework (see Figure 7.1) for further research to build on.

Computers are social actors and CCBT. A further contribution to theory that this thesis provides is a practical application of the CASA paradigm to the field of CCBT. The empirical studies essentially utilised the paradigm set out by Nass et al., 1994 as a way of studying whether human interactions with CCBT programs (that possess minimal social cues) are fundamentally social. Briefly, this paradigm involves taking a finding (in this instance that individual differences in attachment styles influence engagement and the therapeutic alliance in psychotherapy), replacing the human being with a computer (in this case a CCBT program), running an experiment and observing if the behaviours match what would be observed if two people were interacting. If so, the social rule still applies. Overall, the results of Studies 2b and 3 mirrored the relationship between individual differences in attachment styles and psychotherapy, hence the social rule still applies.

Knowles et al., (2014) also alluded to the role that the CASA theory may have in explaining the behaviours some people display when using CCBT programs, for example, the expectation that that programs should respond sensitively and interpersonal responses such as guilt when having not completed CBT homework, or becoming angry at the program. However this is the first known, explicit application of the CASA paradigm to CCBT and the first incorporation of CASA in a theoretical model of how people interact with CCBT programs. Beyond the general hypothesis that people treat CCBT programs as social actors, it was specifically hypothesised that based on attachment system activation, people would respond to CCBT programs as they would a human therapist because people unconsciously applied these attachment related goals and expectations to CCBT programs and that treating computers as social actors is the cognitive basis for why this would happen. Similarly, the development of the therapeutic alliance and sustained engagement with CCBT would be contingent on viewing the CCBT program as a social actor. This framework is highlighted in Figure 7.1. Preliminary evidence suggests this may be the case, however further replication of the current results and further, methodical exploration of the role of CASA in the human – computer interaction in CCBT is needed to corroborate this hypothesis.

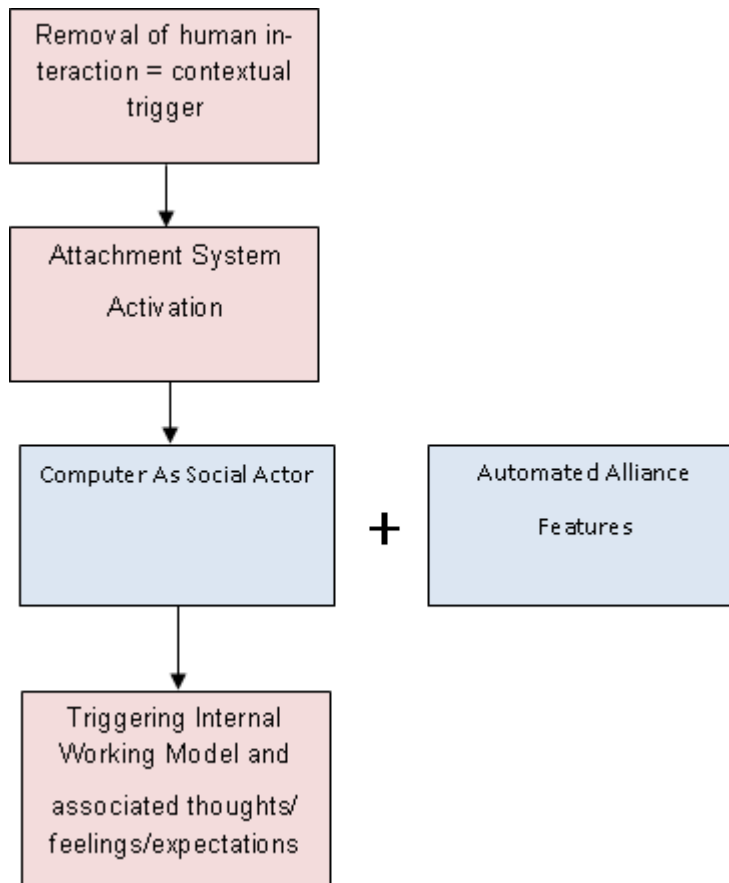


Figure 7.1. Framework for understanding the mechanisms through which the removal of human therapeutic support contextually activates the adult attachment system and how the attachment tendencies associated with the dispositional attachment style of the individual exert their influence on engagement and alliance through treating computers as social actors.

Model of engagement in CCBT. The work presented aimed to investigate each component of the process based model of engagement outlined in Chapter 3. Based around a model of engagement with technology (O’Brien & Toms, 2008; 2010) and the CCBT user journey (Cavanagh & Millings, 2013b), this model views engagement as a series of stages, each with their own attributes. These stages include the point of engagement (uptake), the period of engagement (sustained engagement) and disengagement (treatment completion or attrition). This approach allows engagement to

be defined as more than just program attrition. These studies methodically explore engagement as an active process using a measure (the User Engagement Scale) that was designed specifically for quantifying engagement with technology and adapted for use in CCBT. Study 1 presented in Chapter 4 showed the age of potential CCBT users is negatively associated with the acceptability of CCBT and will therefore influence program uptake. Evidence from Studies 2b and 3 suggest dispositional secure attachment styles and attachment security priming positively influence therapeutic alliances and engagement in unguided CCBT, part of the sustained engagement aspect of the model. Additionally, the systematic review presented in Chapter 3 analysed whether some factors identified within the 'Four P's' model (person, problem, program and provider; Cavanagh & Millings, 2013b) were associated with study level measures of program uptake and completion. The results do provide some corroboration that these factors influence engagement with CCBT. Concurrent use of psychotropic medications and participant age are important demographic variables associated with program uptake and completion. Programs designed to target anxiety disorders are also associated with increased treatment completion. All of these factors are illustrated in Figure 7.2 which depicts the process based model of engagement and the factors which influence each stage, as evidenced by the work presented.

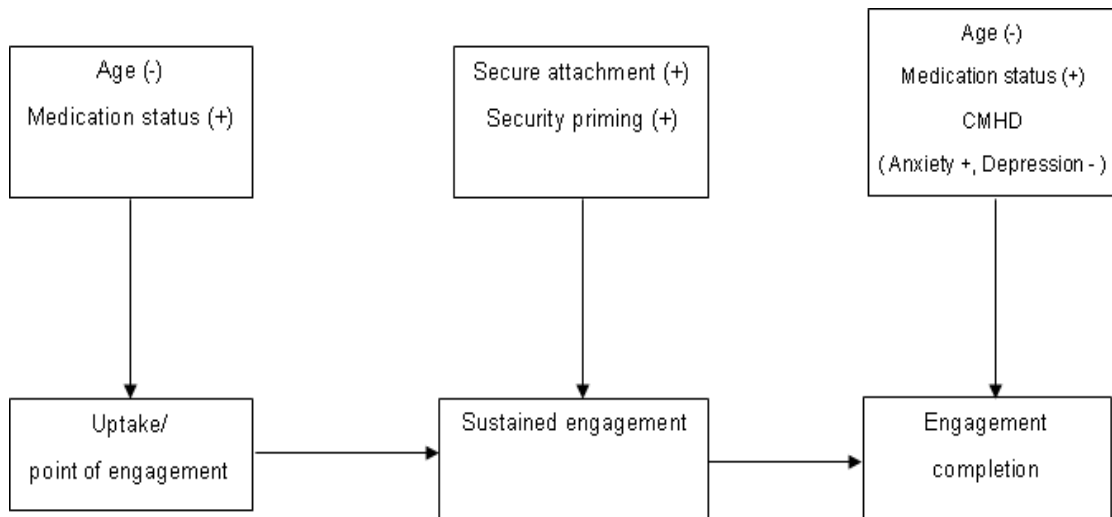


Figure 7.2. The process based model of engagement with CCBT and the factors which have been associated with each stage.

Age appears to be a consistently influential variable in the model of engagement. Age is a significant moderating variable of CCBT effectiveness; as age increases effect sizes decrease. Age is also negatively correlated with the acceptability of CCBT and CCBT completion. Age is therefore an influential variable in aspects of CCBT uptake and completion. Furthermore these findings would suggest that the desire and ability to engage with CCBT is better for populations of younger adults than it is for older adults. This implies CCBT may be particularly well suited to younger working age adults (such as those in higher education) who, through engagement with programs, see better clinical benefit of CCBT than older aged adults. Currently, older age adults may not be suited to using CCBT or may require extra support.

The use of psychotropic medication is also a significant variable associated with increased CCBT uptake and completion. This finding is novel in the area of CCBT but is consistent with evidence from traditional mental health services which also suggests there are benefits of dual – modality treatment on engagement, as well as clinical outcomes (Edlund et al., 2002; Paykel, 1995; Wang et al., 2000). The benefits of dual –

modality treatment may occur because in individual who is adhering to a drug regime may be more open to engaging with psychological therapy, or is better able to engage with therapy because of the clinical benefit of the psychotropic medication. The correlations between the percent of study participants taking psychotropic medication and program uptake and completion represent large effect sizes and are highly significant, construing confidence in these findings. It is important however to note that these findings are based on group level data and are correlational in nature, therefore future research should explore these associations in primary research trials to provide further corroboration of the significance of dual – modality treatment on CCBT engagement.

Across the trials included in the systematic review programs targeting anxiety disorders had significantly higher completion rates than did programs for depression. This finding was both statistically significant and represented a medium sized effect. This finding is consistent with evidence from some primary research trials of CCBT in which participants report dropping out due to depressive symptoms such as low motivation (Klein et al., 2006; Richards, Klein & Austin, 2006). It is also consistent with the findings a review which concluded self-administered and predominantly self – help interventions are most efficacious for motivated clients, whereas therapist – assisted treatments remain optimal for the treatment of clinical depression (Newman et al., 2011). It is also consistent with evidence from traditional health services which indicates depression is a risk factor for non-compliance with both psychiatric and physical medical treatment (DiMatteo, Lepper & Croghan, 2000). Altogether this evidence suggests engagement with self – guided CCBT programs may be optimal for those with anxiety disorders, however engagement with CCBT for depression may require some structured therapeutic support to maintain motivation. This should be

explored in future research, for example an RCT in which people with depression and people with anxiety are randomised to receive guided or unguided CCBT.

7.3. Implications for research

Quality of reporting engagement metrics. It is evident from the quality of the research papers included in the meta – analysis and systematic reviews that research in the field would benefit from greater transparency in the reporting of engagement metrics. Included studies varied in the number of engagement metrics and participant demographic information reported, but overall there was a consistent underreporting of these variables. Future research needs to address this issue in order to provide a clear and consistent picture of how acceptable CCBT programs are in real world deployments. Previous authors have also called for research to not shy away from reporting metrics of non – usage, uptake and attrition because they provide valuable insights into the impact and uptake of e – health interventions and reduce publication biases (Eysenbach, 2005). Furthermore, analysis and discussion of uptake and completion rates provide a picture of the acceptability or tolerability of these interventions which parallel these concepts in conventional treatments (Christensen & Mackinnon, 2006).

It is proposed that in order to achieve this, future research trials should endeavour to clearly report the engagement metrics of uptake, program completion and study completion. These figures can be easily reported by including a Consolidated Standards of Reporting Trials (CONSORT) diagram (Moher et al., 2001) which illustrates the flow of participants through a research trial. This would make the task of reporting and extracting engagement metrics clear and easy (Waller & Gilbody, 2009). Furthermore, the definitions of these metrics must be kept consistent throughout different research trials, otherwise these metrics would not be comparable to each other

between trials. There is a clear need to define engagement with CCBT, as there is no agreed upon definition of engagement with CCBT programs (Cavanagh & Millings, 2013b). The systematic review presented in Chapter 3 provides a comprehensive definition and model of CCBT engagement as well as definitions of engagement metrics which may be utilised in future research. Other metrics of engagement may include repeat programme visits, module completion, completing in - session activities and completing in between-session homework (Cavanagh & Millings, 2013b). Future research should endeavour to find ways to capture these metrics of active engagement as they move beyond the behavioural measures of uptake and completion. Where possible, research should aim to report why participants drop out of CCBT programs and what compelled others to complete them.

The potential for security priming in CCBT. The work presented inspires further questions to be addressed in future research. Given the preliminary evidence suggesting the benefits of security priming on the alliance and engagement with unguided CCBT, further research should aim to replicate and extend these methods with a priming procedure that is more suitable for online dissemination. The priming technique used has been employed successfully in previous studies (Bartz & Lydon, 2004; Boag & Carnelley, 2012; Carnelley & Rowe, 2007; 2010; Rowe & Carnelley, 2003; Rowe et al., 2012) and was considered fit for the purpose of testing the underlying theory, however writing for 10 minutes about a prototypically secure attachment figure may not be suitable for incorporation into online CCBT as it is time consuming. One previous study has evidenced the effectiveness of text based security priming, which involved securely primed participants being sent a text message asking them to visualise their secure attachment figure for three minutes (Otway et al., 2014). This served to ‘boost’ the secure priming already conducted in the laboratory which

may therefore suggest a 10 minute security prime would be necessary when a program user initially logs on which is then ‘boosted’ in following sessions. Further research may also investigate whether the benefits of security priming in the context of CCBT are still evident if participants were only instructed to visualise their secure attachment figure for three minutes. Furthermore, given the evidence suggesting repeated security priming serves to make the secure base schema more chronically accessible (Carnelley & Rowe, 2007; Gillath & Shaver, 2007), the benefits of repeated online security priming on the therapeutic alliance and engagement with CCBT should be investigated. As evidence has also shown securely primed individuals demonstrate more positive affect (Rowe & Carnelley, 2003) it would be interesting to explore whether security priming also adds any clinical benefit to CCBT interventions independent of the CBT specific techniques. Future research may also test the idea that there are individual differences in the benefits of security priming and use this information to identify who security priming may help the most. Future CCBT programs may then have the capabilities to tailor the priming to suit the needs of individual users.

Dismantling the triangle of alliance. Future research should aim to investigate the relative importance of each pathway in the ‘triangle of alliance’ (Cavanagh, 2010) in determining engagement and outcomes in guided CCBT programs. As opposed to the solely human – computer interactions of unguided programs, guided programs include three specific entities, the program user, the program and the human program supporter. Furthermore the pathways between these entities are bidirectional. This is illustrated in Figure 7.3.

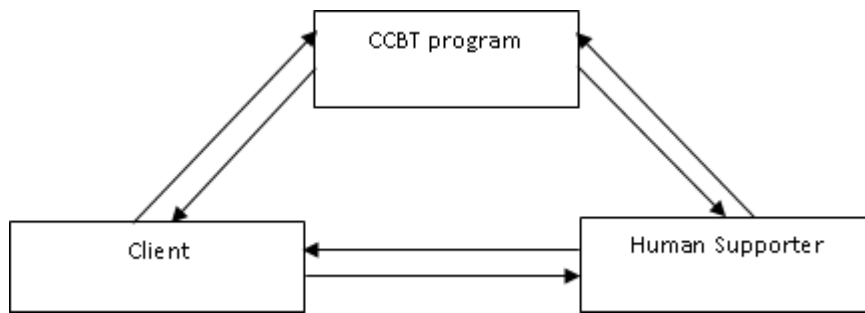


Figure 7.3. The triangle of alliance and the direction of interaction between each entity within it.

Further research should include measures of the working alliance that are adapted to measure the user – supporter alliance as well as the user – program alliance. Running the study for the course of the whole program and including outcomes measuring clinical effectiveness (such as the Beck Depression Inventory, Beck et al., 1961) would also be beneficial. This would permit an analysis as to the relative importance of each alliance pathway in engagement and outcomes and how these associations may change through each phase of the alliance. Replicating Study 2a using this methodology would also determine whether user attachment tendencies are indeed directed at the program supporter rather than the program and whether dispositional attachment is associated with clinical effectiveness in guided CCBT. Studies may measure the quality and quantity of the automated alliance features embedded in programs and the alliance features portrayed by the program supporter. Measuring responses to each would provide an insight as to whether alliance features delivered via the program or via the program supporter are more salient and whether deficiencies in one can be compensated by the other. Isolating these effects would provide evidence for direct relationships between the embodiment of relational features, engagement and outcomes. Future research may also explore whether the quality of the working alliance

between the user and supporter is positively associated with measures of program engagement and whether this is moderated by the human – computer alliance.

Dismantling the human – computer interaction in CCBT. Further deconstruction is needed of how program users may be treating CCBT programs as social actors. The studies presented used the computers are social actors (Nass et al., 1994) paradigm to test whether the way humans behave towards human therapists, based on their attachment styles, still applies when interacting with a computer (that is fulfilling the role of the human therapist). On the whole, the results suggest that they do, however further research may explore how this could differ depending on the amount of human support provided and the number of social cues embedded in programs. For example, future research could explore whether these associations are stronger in programs embellished with more social cues, i.e. interactivity, the ability to choose the gender of the program narrator or the addition of a ‘virtual therapist’ or avatar that interacts with the program user. Such programs would theoretically facilitate the ease at which these programs are treated as social actors and increase the readiness at which program users impart their attachment tendencies onto the program. Future research should explore whether these effects diminish if a human supporter is introduced and whether the human – supporter interaction afforded more cognitive salience than the human – computer interaction. According to the CASA theory, computers are treated as social actors when they replace and fulfil roles traditionally given to humans, therefore the introduction of a human supporter means the computer does not fully replace the human in the equation and the treatment of the computer as a social actor may be reduced. It is hypothesised that the ability to form a therapeutic alliance with unguided CCBT programs is contingent on the quality of human – computer interactions and

(unconsciously) viewing the computer as a social actor. Future studies would serve to test this hypothesis.

Extending these findings. As the studies in this thesis focused on programs targeting depression and anxiety, further research may investigate whether these results are replicated across the range of CMHDs, such as specific phobias or OCD. Future studies may also explore whether these findings extend to non – clinical populations, for example in e – health applications that promote mental health, wellbeing or fitness. These studies focused on single sessions of engagement with CCBT but these programs are typically delivered over 4 – 12 weeks. As the therapeutic relationship is a process of phases (Sexton et al., 1996; Tracey, 1993) further research would be useful to understand whether these associations between attachment styles and the therapeutic alliance in CCBT changes over the course of the entire program. Finally, trials including clinical outcome measures, assessing depression and/or anxiety symptoms would provide a picture of how adult attachment styles and security priming may be associated with differences in clinical effectiveness.

7.4. Implications for practice

Managing the mental health needs of students in higher education.

Prevalence rates of mental health problems in student populations are high worldwide and the psychological morbidity of university students is a neglected public health problem which holds significant implications for campus health services (Bayram & Bilgel, 2008). The demand placed on mental health services in higher education has significantly increased over the past several years (Grant et al., 2011) and it is unrealistic to expect that mental health services will be able to offer face to face therapy for all people who require psychological therapies (RCP, 2011). Just as the stepped model of care has been implemented in routine primary care, mental health services in

higher education need to prioritise demands against the resources available. Part of this includes increasing the availability of and access to CCBT self – help (RCP, 2011). A recent meta-analysis investigating the use of CCBT interventions to improve CMHDs, psychological distress, and stress in university students has demonstrated the effectiveness of these interventions, especially when compared to inactive controls (Davies, Morriss & Grazebrook, 2014). But will students use CCBT if it is available to them? The results of this thesis suggest that CCBT is an acceptable treatment option for student populations and engagement may be encouraged if tailored to meet their attachment needs. Study 1 illustrated acceptability of CCBT was high and attitudes towards CCBT were rated as positive. CCBT was also rated as more preferable than using self – help workbooks or using psychotropic medications. Furthermore, these findings are provided in the context of a naturalistic study which reflects real world CCBT dissemination. These findings corroborate previous research which has also demonstrated CCBT is an acceptable treatment option and is generally met with positive attitudes (Lintvedt et al., 2008; Mitchell & Dunn, 2007; Mitchell & Gordon, 2007). However, credibility and expectancy for improvement remained low, which is consistent with previous research (Mitchell & Dunn, 2007; Mitchell & Gordon, 2007). This suggests there is a need to improve credibility and expectancy, perhaps through user education. Together, these results support the drive to expand the implementation of CCBT to manage the mental health needs of higher education students. This is important given there is a large, unmet need for mental health interventions in university students (Eisenberg, Golberstein & Gollust, 2007). CCBT will not be appropriate for all people however and so dissemination should be carefully considered based on the students suitability for CCBT. The results of this thesis highlight client centred factors such as experiencing anxiety disorders, being of a younger age, already

using psychotropic medications and possessing a secure attachment style may make an individual particularly suited to using CCBT treatments. Efforts should continue to explore these variables, how they help facilitate CCBT engagement and the optimal method of CCBT dissemination in higher education mental health services.

Implications for clinical populations and practice. The findings from this body of work may also have implications for clinical populations and practice. To be included in the meta – analysis and systematic review, research trials needed to include participants who were assessed to be experiencing a CMHD according to DSM criteria. As such these studies have included clinical populations to whom the findings may be extrapolated. Overall the meta – analysis demonstrates CCBT is an effective intervention for mild to moderate symptoms of CMHDs. This finding supports the continued use of CCBT as a low intensity intervention in primary care (NICE, 2011a; 2006). NICE currently does not recommend CCBT as a treatment option for the management of social anxiety (NICE, 2013), however the meta analysis included 10 studies demonstrating the effectiveness of CCBT in the management of this disorder. The benefits of CCBT on social anxiety should be investigated in future randomised controlled trials in order to inform the evidence base and clinical guidance for social anxiety disorder. Furthermore, results from the systematic review suggest that depression is a risk factor for program attrition. Firstly this suggests that guided programs may remain the most optimal for the use of CCBT in the management of depression in the stepped model of care. It also suggests motivated people with anxiety disorders may be particularly suited to highly cost effective, unguided CCBT programs. Evidence from the systematic review also illustrating the use of psychotropic medications is associated with increased CCBT uptake and completion is of importance to clinical practice. It suggests that individuals taking psychotropic medications may be

particularly well suited to using CCBT as they are at less risk of stopping the program prematurely.

Given the volume of participants in the empirical studies who reported experiencing symptoms of depression and/or anxiety which were within the diagnostic range of mild – severe (approximately 50% in each study), it may be possible to tentatively generalise these results to clinical populations. However there are limitations to the generalisation of these results beyond student samples because of differences between student populations and the general population. For example, higher education aged students express greater uncertainty in their attitudes (an issue particularly relevant to Study 1), are more persuadable than older adults and are more cognitively orientated than non – college educated populations (Sears, 1986). Rather than generalising the results of the empirical studies to clinical populations who are not in higher education, the findings present a framework from which future research could build upon in clinical populations.

CCBT program design. The results presented also offer some avenues of exploration for CCBT program design. Firstly, although the general attitudes and acceptability of CCBT were good, participants remained unconvinced of the credibility of CCBT and its effectiveness in reducing symptoms of depression. This may reflect one reason for low uptake rates of CCBT (Kaltenthaler, Sutcliffe et al., 2008; Waller & Gilbody, 2009) and as demonstrations of CCBT have been shown to improve CCBT credibility and expectancy, program designers should consider making program demonstration and introduction videos a standard feature.

The consistently low working alliance ratings would suggest there would be value in incorporating more common factors designed to augment the relational features in CCBT programs. A documented issue with self – help materials, including

bibliotherapy and CCBT is that common factors designed to establish the therapeutic relationship are more evident than those designed to develop and maintain the relationship (Barazzzone et al., 2012; Richardson et al., 2010). The present results suggest this lack of certain common factors may be impeding the ability to form good working alliances with programs, which in turn may reduce their overall effectiveness (Richardson & Richards, 2006). Designing programs which use relational agents (which would act as ‘virtual therapists’) may be one promising way to address this issue (Bickmore & Picard, 2005). Relational agents replicate face to face conversations and include non – verbal communication (like sympathetic nods of the head). They are specifically designed to model human interpersonal interactions that facilitate rapport, trust and working alliances (Bickmore & Gruber, 2010). These avatar like agents are rated highly on the therapeutic alliance (Bickmore et al., 2010), but they have not been utilised yet in CCBT programs.

As individuals high on attachment security are better able to form positive alliances and engage well with CCBT programs, perhaps it is these individuals who may be most suited to using fully automated, unguided programs. The incorporation of brief attachment style screenings into programs or into preliminary assessments undertaken by health professionals in primary care may help identify who is more suitable for unguided CCBT delivery and who may require some amount of guided, human support (individuals high on attachment insecurity). Tailoring CCBT programs to meet the attachment needs of certain individuals may also be of benefit. For example, someone who is high on attachment anxiety may respond particularly well to attempts by the program to show empathy or warmth and so computerised algorithms could increase the number of these relational features available in each session. As security priming has been shown to enhance engagement and the alliance in unguided CCBT,

these programs may be augmented by the use of brief online security priming techniques also embedded in programs. Given the benefits of repeated security priming have been evidenced (Carnelley & Rowe, 2007; Gillath & Shaver, 2007; Otway et al., 2014), designers should embed automated online security priming techniques at regular intervals during the course of the program.

7.5. Methodological considerations

The results of this thesis should be viewed in light of some methodological considerations. As few studies included in the meta analysis reported using follow up measures, the conclusions are constrained to short – term effectiveness only. It is possible however that moderators of immediate therapeutic gains (such as age) differ to those moderating longer-term outcomes (Gellatly et al., 2007). Both the meta – analysis and systematic review of engagement are limited by the quality of the available literature at the time of writing. For the meta analysis the methodological quality of the studies included was adequate but risk of bias was moderate. For the systematic review the included studies varied in the quality of reporting and so issues with missing data meant the analysis may have be underpowered to find significant associations between engagement metrics and the ‘Four P’ (Cavanagh & Millings, 2013b) variables.

Due to time and resource constraints, studies could not be run for the full length of the programs. As therapy is considered as a set of stages (beginning, middle and end; Sexton et al., 1996; Tracey, 1993) the associations between attachment styles and responses to CCBT may change as the course of therapy continues. However, evidence does suggest that the therapeutic alliance is established early in therapy, and early alliance ratings are more predictive of outcome and engagement, compared to the mid or late phases (Horvath & Symonds, 1991; Piper, et al., 1991). As such these findings

are still important indicators of the association between attachment styles and in – treatment behaviours.

Studies 1 and 2b were naturalistic studies that did not exert strict experimental control over the environment that participants conducted the study in and there was an inability to monitor participant attention to the program. One could argue that this reduction of experimental control may reduce the reliability of the results of these studies. These studies are also correlational in nature. However, although highly controlled CCBT studies have demonstrated effectiveness and acceptability, problems are commonly encountered when translating these results in real world settings (Doherty et al., 2012). Much less is known about the realities of CCBT implementation outside of controlled research trials (Andersson, 2010). As the majority of CCBT programs are accessed online, this type of study design was deemed the most ecologically valid in order to produce results that are applicable in real world deployments.

There were no strict inclusion or exclusion criteria for participation in these studies in terms of needing a clinical diagnosis of a CMHD and the sample was based on a population of students in higher education. Questions may therefore arise as to the generalisability of these findings to clinical populations for whom CCBT is actually intended. Although no clinical restrictions were imposed on who may be included in these studies, the inclusion of mental health measures in each study (the PHQ – 4 or the PHQ – 9 and GAD – 7) was intended to account for this. In each study, around half of the participants were experiencing symptoms of depression and/or anxiety ranging from mild to severe in their severity. Mental health was also accounted for statistically (using moderation or subgroup analysis) and overall there were not significant differences on main outcomes based on symptom severity measured at baseline.

There is an absence of psychometrically valid instruments that measure constructs such as the working alliance and engagement in context of CCBT. As such many of the measures used in the empirical studies were adapted versions of existing instruments. For example, the short form of the Working Alliance Inventory (Tracey & Kokotowitc, 1989) was adapted to read ‘the program’ instead of ‘my counsellor’. The measures used were not bespoke instruments and so may have introduced threats to instrument reliability and construct validity. However, Cronbach’s alphas of the adapted measures used ranged from good to excellent suggesting the adapted measures possessed good internal consistency. Furthermore, the adapted measures were changed as little as possible in order to reduce threats to construct validity. Measures such as the Working Alliance Inventory have been successfully adapted in previous CCBT studies (Andersson et al., 2012; Richards et al., 2013) and the replacement of the word ‘counsellor’ with ‘program’ is consistent with the ‘computers are social actors’ paradigm (Nass et al., 1994). As such, it is believed that the threat priming effect evident in Study 2b and the results of Study 3 would still be present if these measurement issues were addressed. Future research should however aim to develop more bespoke, objective measures. For example measures of CCBT engagement would benefit from encapsulating behavioural aspects like the number of times a user logs onto a program and for how long, or reaction times to program output. This would permit investigations into how attachment may influence behavioural aspects of program engagement as well as the cognitive components measured by the User Engagement Scale.

The empirical studies utilised three different CCBT programs; Beating the Blues, Living Life to the Full and the Serenity Program. This may generate questions as to whether differences in results between studies are due to differences between CCBT

programs. For example, evidence suggests programs differ in the embodiment of relational features (Barazzzone et al., 2012) and this may create nuanced differences in program alliance and engagement. However, sparse research currently exists indicating which of these programs embody a good number of relational features. There is therefore no empirical basis for deciding and justifying which program would be best to use consistently throughout these studies. Furthermore, there are benefits to using multiple programs. There are a wide range of CCBT programs currently being used in health care settings and so using multiple programs throughout this thesis is reflective of real world dissemination and patient choice (for example, participants could choose which *Living Life to the Full* module to complete). Using multiple programs through this research, coupled with the study designs have therefore improved the external validity of the findings presented. Future research is required however to ‘dismantle’ CCBT packages and investigate the effects of different relational features and how they influence engagement and outcomes (Cavanagh & Millings, 2013a).

The conclusions of this thesis are limited to the area of CBT and so future research may explore whether these findings can be extended to other psychological approaches. CBT is typically the first non – pharmacological treatment choice for many psychological disorders (Bennett – Levy et al., 2010), however, interest in approaches such as Mindfulness – Based Therapies has been increasing exponentially (Plaza, Demarzo, Herrera-Mercadal & García-Campayo, 2013). Contemporary research is beginning to demonstrate the effectiveness of computerised and mobile application based mindfulness interventions for a variety of problems (Glück & Maercker, 2011; Krusche, Cyhlarova & Williams, 2013; Plaza et al., 2013). Although limited to the CBT approach, the conclusions from this thesis may offer a framework from which to

explore engagement with, and relational aspects of computerised mindfulness based approaches.

Similarly, the conclusions presented are limited to internet based programs accessed via a computer. It is unclear whether these findings would extend to mobile phone based mental health applications. Due to the sheer pervasiveness of mobile technology the exploration of mobile phones as a platform for the delivery of mental health applications (mHealth) is increasing (Barton, 2012; Proudfoot et al., 2013). Research exploring the efficacy of mobile mental health applications is not occurring at the same pace that applications are being produced (Proudfoot, 2013), however research is beginning to demonstrate some applications can be effective in reducing symptoms of CMHDs (Donker et al., 2013; Harrison et al., 2011; Proudfoot et al., 2013). As the conclusions in this thesis are largely based on the ‘computers as social actors’ paradigm it is unclear whether mobile phones are also experienced as social actors and whether the associations evidenced in this thesis would extend to mobile platforms. Some authors have maintained that mobile phone users can develop close emotional and physical attachments to their phones, using them like a social actors and ‘personal social robots’ (Tussyadiah, 2014; Vincent, 2013). Future research could explore these theories and whether the results of the studies presented in this thesis are replicated in mobile phone – human interactions.

7.6. Conclusion

In conclusion, this thesis aimed to explore how issues surrounding real world CCBT implementation may be reduced by paying attention to client related variables and in particular, individual differences in adult attachment styles. Results from a meta – analysis demonstrated CCBT is an effective intervention for CMHDs and this effectiveness did not differ between guided and unguided programs. A systematic

review and analysis highlighted that although CCBT uptake is generally low, attrition figures are comparable to that of face to face therapies. Furthermore, uptake and completion of programs may be associated with client psychotropic medication use, age and the type of CMHD. Interestingly, uptake and attrition however did not differ between guided and unguided programs. The acceptability and attitudes towards CCBT in a student population was generally good, although problems with CCBT credibility and expectancy may remain a concern for implementation. Although adult attachment was not significantly associated with the therapeutic alliance or engagement with a guided CCBT program, there was tentative evidence to suggest that attachment security is positively associated with program engagement and the formation of a therapeutic alliance with unguided CCBT. This suggests that where unguided programs are concerned, the relationship between adult attachment and use of CCBT may mirror the relationship between attachment styles and traditional psychotherapies. A theoretical model is proposed to account for these findings in which the absence of human support acts as a threat prime, triggering attachment system activation for those individuals who are highly insecure (fearful – avoidant). Attachment related goals and expectations are then placed upon the CCBT program due to unconsciously experiencing the program as a social actor. Finally, security priming produced higher levels of program engagement and better working alliance compared to neutral primes. These effects were not moderated by dispositional attachment styles. These results show how dispositional attachment orientations, founded on the intimate bonds we form in infancy and in adulthood, extend their influence beyond our everyday relationships and the traditional client – therapist interactions of psychotherapy into the exclusively human – computer interaction of unguided CCBT. Although these conclusions are tentative, they do provide a theoretical framework and empirical basis for the continued exploration of

attachment styles, security priming and the role of human – computer interaction in augmenting relational aspects and engagement with computerised CBT.

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²⁹ * Denotes a study included in the meta – analysis reported in Chapter 2

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Appendices

Appendix A

Table A1: Selected study characteristics for meta-analysis presented in Chapter 2.

Study	Age (mean)	Females (N, %)	Control	CMHD	Outcome	Program	Access	Referral	CCBT Support	CCBT Support time	Risk of bias
Andersson et al. (2005)	36.10	NR, 75	WL	Dep	BDI	NN	Open/Int	Self	Y	120.00	13
Andersson, et al. (2006)	37.30	33, 52	WL	SAD	SAS	NN	Open/Int	Self	Y	180.00	13
Andersson Carlbring et al. (2012)	38.25	123, 61	Discussion	SAD	LSAS-SR	NN	Open/Int	Self	Y	135.00	11
Andersson, Enander et al. (2012)	34.00	67, 66.34	Email therapy	OCD	YBOCS	NN	Open/Int	Self	Y	129.00	9
Andersson, Paxling et al. (2012)	42.00	41, 75.93	WL	GAD	PSWQ	NN	Open/Int	Self	Y	92.00	10
Bell et al. (2012)	35.25	56, 67.47	WL	Anx	WSAS	NN	Open/Int	Pro.	Y	30.00	13
Berger et al. (2009)	28.90	29, 55.80	WL	SP	LSAS-SR	NN	Open/Int	Self	Y	NR	12
Bergstrom et al. (2010)	34.20	61, 61	Group therapy	PD	PDSS	NN	Open/Int	Pro.	Y	35.40	11
Botella et al. (2012)	24.40	61, 79	WL	SAD	Fear (TB)	Talk to me	Open/Int	Self	N	0.00	15
Carlbring et al. (2001)	34.00	29, 71	WL	PD	BSQ	NN	Open/Int	Self	Y	90.00	14
Carlbring et	37.90	15, 68	App.Relax	PD	BSQ	NN	Open/Int	Self	Y	30.00	13

al. (2003)											
Carlbring et al. (2005)	35.00	NR,71	F2F therapy	PD	BSQ	NN	Open/Int	Self	Y	150.00	13
Carlbring et al. (2006)	36.70	NR, 60	WL	PD	BSQ	NN	Open/Int	Self	Y	238.00	13
Carlbring et al. (2007)	32.65	37, 65	WL	SAD	SAS	NN	Open/Int	Self	Y	255.00	15
Carlbring et al. (2011)	38.80	41, 76	SG	Anx	BAI	NN	Open/Int	Self	Y	150.00	11
Choi et al. (2012)	39.00	80,44	WL	Dep	CBDI	BYM	Open/Int	Self	Y	97.42	10
Christensen et al. (2004)	36.46	375, 72	Psych.Ed	Dep	CES - DS	MoodGYM	Open/Int	Self	Y	NR	11
Clarke et al. (2009)	22.60	NR, 80	TAU	Dep	PHQ – 8	NN	Open/Int	Self	N	0.00	11
Day & McGrath (2013)	23.55	59, 89.30	WL	TD	DASS	NN	Open/Int	Self	Y	120.00	11
de Graaf et al. (2009)	44.87	NR, 44	TAU	Dep	BDI	CYL	Open/Int	Self	N	0.00	13
Farrer et al. (2011)	41.58	127,82	TAU	Dep	CES-D	MoodGYM	Open/Int	Self	N	0.00	12
Furmark et al. (2009)	36.13	81, 68	Bib.Therapy	AD	SPS	NN	Open/Int	Self	Y	135.00	12
Gellego et al. (2011)	39.29	28, 68.30	WL	SP	Fear-TB	Talk to Me	Open/Int	Mixed	N	0.00	17
Hedman et al. (2011)	33.35	45, 36	Group CBT	SAD	LSAS	NN	Open/Int.	Mixed	Y	150.00	10
Johanson et al. (2012)	45.25	58, 71.60	Discussion Forum	Dep	BDI	NN	Open/Int.	Self	Y	95.20	10
Johnston et al. (2011)	41.62	77,59	WL	Anx	GAD-7	Anxiety Program	Open/Int	Self	Y	69.59	12
Kiropoulos	38.96	62,73	F2F CBT	PD	PDSS	PanicOnline	Open/Int	Self	Y	NR	14

et al. (2008)											
Klein et al. (2006)	NR	44,80	CBT workbook	PD	PDSS	PanicOnline	Open/Int	Self	Y	NR	9
Litz et al. (2007)	39.25	NR	counseling	PTSD	PTSD –SS –IV	D.S	Open/Int	Pro.	Y	NR	12
Lorian et al. (2012)	44.18	32, 67	WL	GAD	GAD-7	Worry Program	Open/Int	Self	Y	NR	13
Marks et al. (2004)	38.35	62, 67	relaxation	PD	FQ	FearFighter	Static/ PC	Pro.	Y	76.00	9
Paxling et al. (2011)	39.30	71, 79.80	WL	GAD	PSWQ	NN	Open/Int.	Self	Y	97.00	10
Perini et al. (2009)	49.29	35, 77.78	WL	Dep	PHQ - 9	Sadness Program	Open/Int.	Self	Y	111.00	11
Proudfoot, et al. (2003)	44.70	123,74	TAU	Dep	BDI	BTB	Static/ PC	Pro.	Y	50.00	12
Proudfoot, et al. (2004)	43.50	202, 74	TAU	Dep	BDI	BTB	Static/ PC	Pro.	Y	50.00	11
Richards, et al. (2006)	36.59	10,32	Psch.ED.	PD	PDSS	Panic Online	Open/Int	Self	Y	NR	16
Robinson et al. (2010)	46.96	99,68	WL	GAD	GAD-7	Worry Program	Open/Int	Self	Y	80.08	10
Silfvernagel et al. (2012)	32.40	37, 65	WL	PD	PDSS	NN	Open/Int	Self	Y	120.00	11
Spence et al. (2011)	42.60	34, 81	WL	PTSD	PCL-C	PTSD-P	Open/Int	Self	Y	103.91	10
Spek et al. (2008)	55.00	191,64	Group CBT	Dep	BDI	CWD	Open/Int	Self	N	0.00	12
Titov et al (2008)a	38.13	58, 58.59	WL	SP	SIAS	Shyness Program	Open/Int	Self	Y	125.00	12
Titov et al (2008)b	36.79	51, 62.96	WL	SP	SIAS	Shyness Program	Open/Int	Self	Y	126.76	12
Titov et al (2008)c	38.52	35,53.85	WL	SP	SIAS	Shyness Program	Open/Int	Self	Y	160.00	12
Titov et al.	44.00	34, 76	WL	GAD	GAD-7	Worry	Open/Int	Self	Y	130.00	13

(2009)											
						Program					
Titov et al. (2010)	43	94,74	WL	Dep	BDI	TSD	Open/Int	Self	Y	60.05	11
Titov et al. (2011)	43.9	54,73	WL	T.D	DASS - 21	TWP	Open/Int	Self	Y	84.76	15
Warmerdam et al. (2010)	45.00	NR, 71	PST	Dep	CES – DS	CWD	Open/Int	Self	Y	160.00	15
Wims et al. (2010)	42.08	41,76	WL	PD	PDSS	TPP	Open/Int	Self	Y	75.00	12

Note: Control = type of comparator group. App.R relax = applied relaxation, Bib.Therapy = bibliotherapy, Discussion = supportive discussion group, F2F = face to face, Psych.Ed = psychoeducation, PST = problem solving therapy, TAU = treatment as usual, WL = wait list. CMHDs: Anx = anxiety, Dep = depression, GAD = generalised anxiety disorder, OCD = obsessive compulsive disorder, PD = panic disorder, PTSD = post traumatic stress disorder, SAD = social anxiety disorder, SP = Social Phobia, T.D = Transdiagnostic, refers to depression and anxiety. NN = no name, BYM = *Brighten Your Mood*, BTB = *Beating the Blues*, CWD = *Coping With Depression*, CYL = *Colour Your Life*, D.S = *De-Stress*, PTSD-P = *The PTSD Program*, TSD = *The Sadness Program*, TPP = *The Panic Program*, TWP = *The Wellbeing Program*, W.P = *The Worry Program*. Outcomes: BAI = *Beck Anxiety Inventory*, BDI = *Beck Depression Inventory*, BSQ = *Bodily Sensations Questionnaire*, CDBI = *Chinese Beck Depression Inventory*, CES-DS = *Center for Epidemiologic Studies Depression Scale*, Fear - TB = *Fear -Target Behaviour*, GAD – 7 = *Generalized Anxiety Disorder scale (7 item)*, LSAS = *Lebowitz Social Anxiety Scale*, LSAS-SR = *Lebowitz Social Anxiety Scale - Self Report*, DASS = *Depression and Anxiety Severity Scale*, FQ = *Fear Questionnaire*, GAD-7 = *Generalized Anxiety Disorder 7 Scale*, PDSS = *Panic Disorder Severity Scale*, PHQ - 9 = *Patient Health Questionnaire*, PCL-C = *PTSD disorder check list civilian version*, PSWQ = *Penn – State Worry Questionnaire*, PTSD-SS-IV = *PTSD Symptom Scale Interview Version 4*, SAS = *Social Anxiety Scale*. SPS = *Social Phobia Scale*, SIAS = *Social Interaction Anxiety Scale*, WSAS = *Work and Social Adjustment Scale*, YBOCS = *Yale – Brown Obsessive Compulsive Scale*. Access: Open/Int = open access via the internet, Static/PC = static PC access. Referral: Self = self-referred, Pro = professional referral. CCBT Support: Y = yes (guided), N = no (unguided). CCBT support time is given in minutes per participant for the duration of the intervention. Risk of bias = a possible score out of 21 based on the NICE randomised controlled trial methodology checklist (2009). A higher score refers to a higher risk and lower methodological quality.

Appendix B

Syntax for the moderator analysis written by Field and Gillett (2010).

Launcher program: Launch_Meta_Mod_d.sps

*****.

* Field, A. & Gillett, R. (2009). "How To Do Meta-Analysis".

* British Journal of Mathematical and Statistical Psychology.

*****.

cd "%HOMEDRIVE%%HOMEPATH%\My Documents\Meta-analysis".

insert file="Meta_Mod_d.sps".

Moderator_d d=d n1=n1 n2=n2 conmods=() catmods=().

Appendix C:*Table C1: Selected study characteristics for trials included in the systematic analysis presented in Chapter 3.*

Study	CMHD	Program	Design	Uptake %	CCBT <i>n</i>	Program completers, <i>n</i> (%)
Andersson et al. (2005)	Depression	NN	RCT	34.11	57	36 (63.16)
Andersson et al. (2006)	Anxiety disorder	NN	RCT	27.00	32	18 (56.25)
Carlbring et al. (2003)	Anxiety disorder	NN	RCT	41.51	11	8 (72.73)
Carlbring et al. (2005)	Anxiety disorder	NN	RCT	11.48	25	22 (88.00)
Carlbring et al. (2006)	Anxiety disorder	NN	RCT	16.76	30	24 (80.00)
Carlbring et al. (2007)	Anxiety disorder	NN	RCT	24.69	30	27 (90.00)
Carlbring et al. (2011)	Anxiety disorder	NN	RCT	39.42	27	16 (59.26)
Cavanagh et al. (2006)	Depression	BTB	OT	100.00	219	135 (61.64)
Christensen et al. (2004)	Depression	MG	RCT	8.58	182	136 (74.73)
Clarke et al. (2010)	Depression	NN	RCT	98.16	83	82 (98.80)
Cooper et al. (2011)	Depression	BTB	OT	4.12	12	6 (50.00)
de Graaf et al. (2009)	Depression	CYL	RCT	1.13	100	36 (36.00)
Dear et al. (2011)	Anxiety disorder	TWP	RCT	88.89	32	26 (81.25)
Hedman et al. (2011)	Anxiety disorder	NN	RCT	54.78	64	51 (79.69)
Kenwright et al. (2001)	Anxiety disorder	FF	OT	41.22	54	32 (59.00)
Kiropoulos et al. (2008)	Anxiety disorder	PO	RCT	10.76	46	41 (89.10)

Klein et al. (2006)	Anxiety disorder	PO	RCT	42.31	19	18 (94.74)
Klein et al. (2010)	Anxiety disorder	PTSD - O	OT	16.42	22	16 (72.73)
Learmonth et al. (2008)	Depression	BTB	OT	NR	104	71 (68.27)
Learmonth et al. (2008)	Depression	BTB	OT	65.95	555	384 (71.00)
Lorian et al. (2012)	Anxiety disorder	TWP	RCT	71.64	25	21 (87.50)
Marks et al. (2004)	Anxiety disorder	FF	RCT	72.09	37	21 (56.76)
Nordgreen et al. (2010)	Anxiety disorder	NN	OT	31.03	27	19 (70.37)
Proudfoot et al. (2003)	Depression	BTB	OT	NR	20	11 (55.00)
Proudfoot et al. (2003)	Depression	BTB	RCT	53.87	89	55 (61.80)
Proudfoot et al. (2004)	Depression	BTB	RCT	54.58	146	92 (63.01)
Richards et al. (2002)	Anxiety disorder	NN	OT	46.67	14	9 (64.29)
Richards et al. (2006)	Anxiety disorder	PO	RCT	47.06	12	10 (83.33)
Ruwaard et al. (2010)	Anxiety disorder	NN	RCT	35.37	27	24 (88.89)
Salkovskis et al. (2006)	Depression	CPP	RCT	76.80	50	38 (76.00)
Spek et al. (2008)	Depression	CWD	RCT	32.37	102	67 (65.69)
Titov et al. (2011)	Depression	TWP	RCT	88.51	39	30 (76.92)
Vernmark et al. (2010)	Depression	NN	RCT	31.43	29	17 (58.62)
Warmerdam et al. (2010)	Depression	CWD	RCT	NR	88	34 (38.64)
White et al. (2000)	Anxiety disorder	NN	OT	81.58	33	26 (83.87)
Wootton et al. (2011)	Anxiety disorder	OCDP	OT	53.66	22	17 (77.27)

Wright et al. (2005)	Depression	NN	RCT	NR	15	13 (86.67)
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Note: NN = no name, BTB = Beating the Blues, MG = Mood GYM, CYL = Color Your Life, TWB = The Wellbeing Program, FF = FearFighter, PO = Panic Online, PTSD-O = PTSD online, CPP = CarePartners Program, CWD = Coping with Depression, OCDP = The OCD Program. RCT = Randomized Controlled Trial, OT = Open Trial.

Appendix D:

Attitudes Toward Seeking Professional Psychological Help Scale – Short Form - Adapted (Fischer & Farina, 1995).

For these first set of questions we are interested in the various attitudes you may have towards use of computerised cognitive behavioural therapy (CCBT) as a treatment for mild to moderate depression. Please read each statement carefully and indicate your level of agreement on the scale provided;

1 strongly disagree, 2 somewhat disagree, 3 neither agree nor disagree, 4 somewhat agree, 5 strongly agree

1. If I was diagnosed with mild to moderate depression, I would be inclined to use a computerised CBT programme as help.
2. The idea of working through my problems with a CCBT programme strikes me as a poor way to get rid of symptoms of depression
3. If I were experiencing depression at this point in my life, I would be confident that I could find relief in this programme.
4. There is something admirable in the attitude of a person willing to cope with his or her conflicts and fears without resorting to this type of computerised self-help therapy.
5. I would seek out computerised therapy if I were worried or upset for a long period of time rather than seeking out a therapist.
6. I might want to use computerised therapy in the future, if experiencing depression.
7. A person experiencing depression is not likely to solve it alone; he or she is likely to solve the problem with the help of computerised therapy.
8. Considering the time and expense involved in therapy, a computerised cognitive behavioural therapy program would have more value to a person than face-to-face therapy.
9. A person should work out his or her own problems; using computerised cognitive behavioural therapy be a last resort.
10. Personal and emotional troubles, like many things, tend to work out by themselves.

Appendix E:

Credibility and expectancy questionnaire - adapted (CEQ – A; Devilly & Borkovec, 2000).

Please answer the questions below and select your level of agreement with the following statements. In these questions, answer in terms of what you think.

(1) How logical is it to use a computerised cognitive behavioural therapy program is to treat depression

1 very illogical, 2 somewhat illogical, 3 neutral, 4 somewhat logical, 5 very logical

(2) How successful do you think a CCBT programme would be in reducing your own depressive symptoms?

1 very unsuccessful, 2 somewhat unsuccessful, 3 neutral, 4 somewhat successful, 5 very successful

(3) How confident would you be in recommending a CCBT programme to a friend who is experiencing similar problems?

1 very unconfident, 2 somewhat unconfident, 3 neutral, 4 somewhat confident, 5 very confident

(4) By the end of a CCBT program, how much improvement in your depressive symptoms do you think may occur?

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

(5) At this point, how much do you really feel that a CCBT programme would help to reduce depressive symptoms?

1 very unhelpful, 2 somewhat unhelpful, 3 neutral, 4 somewhat helpful, 5 very helpful

(6) By the end of the CCBT program, how much improvement in your depression symptoms do you really feel may occur?

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Appendix F:

The Experiences in Close Relationships Scale – Adapted (ECR – A; Brennan, Clark & Shaver, 1998; Rowe & Carnelley, 2003).

Instructions: The following statements concern how you generally feel in your close relationships. A close relationship does not just mean a romantic partner; close relationships could be with a friend, your parents or a sibling (for example). Please remember: we are interested in how you think/feel generally. Please indicate the extent to which you agree with each statement

Response Scale;

1 strongly disagree, 2 disagree, 3 somewhat disagree 4 neutral, 5 agree somewhat, 6 agree, 7 strongly agree

1. I prefer not to show people close to me how I feel deep down.
2. I worry about being abandoned.
3. I am very comfortable being close to others.
4. I worry a lot about my relationships.
5. Just when people start to get close to me I feel myself pulling away.
6. I worry that people won't care about me as much as I care about them.
7. I get uncomfortable when people want to be very close.
8. I worry a fair amount about losing my relationships.
9. I don't feel comfortable opening up to others.
10. I often wish that my loved ones' feelings for me were as strong as my feelings for them.
11. I want to get close to others but they keep pulling away.
12. I often want to merge completely with others, and this sometimes scare them away.
13. I am nervous when others get too close to me.
14. I worry about being alone.
15. I feel comfortable sharing my thoughts and feelings with those I am close to.
16. My desire to be close sometimes scares others away.
17. I try to avoid getting too close to others.
18. I need a lot of reassurance that I am loved by those close to me.
19. I find it relatively easy to get close to others.

20. Sometimes I feel that I force others to show more feeling, more commitment.
21. I find it difficult to allow myself to depend on others.
22. I do not often worry about being abandoned.
23. I prefer not to be close to others.
24. If I can't get those close to me to show interest in me, I get upset or angry.
25. I tell those close to me just about everything.
26. I find that others don't want to get as close as I would like.
27. I usually discuss my problems and concerns with those close to me.
28. When I'm involved in a relationship, I feel somewhat anxious and insecure.
29. I feel comfortable depending on others.
30. I get frustrated when those I am close to aren't around me as much as I would like.
31. I don't mind asking others for comfort, advice, or help.
32. I get frustrated when those close to me are not available when I need them.
33. It helps to turn to others in times of need.
34. When those close to me disapprove of me, I feel really bad about myself.
35. I turn to others for many things, including comfort and reassurance.
36. I resent it when those I am close to spend time away from me.

Appendix G:**Patient Health Questionnaire – 4 (Kroenke , Spitzer , William, Löwe , 2009)**

Please read the questions carefully and tick the appropriate response. Over the past two weeks have you been bothered by these problems?

Response scale: 0 not at all, 1 several days, 2 more days than not, 3 nearly every day

1. Feeling nervous, anxious or on edge?
2. Not being able to stop or control worrying?
3. Feeling down, depressed or hopeless?
4. Little interest or pleasure in doing things?

Appendix H:**Patient health questionnaire – 9 (PHQ – 9; Spitzer, Kroenke & Williams, 1999).**

Over the last 2 weeks, how often have you been bothered by any of the following problems?

Response scale: 0 not at all, 1 several days, 2 more days than not, 3 nearly every day

- 1) Little interest or pleasure in doing things
- 2) Feeling down, depressed, or hopeless
- 3) Trouble falling or staying asleep, or sleeping too much
- 4) Feeling tired or having little energy
- 5) Poor appetite or overeating
- 6) Feeling bad about yourself – or that you are a failure or have let yourself or your family down
- 7) Trouble concentrating on things, such as reading the newspaper or watching television
- 8) Moving or speaking so slowly that other people could have noticed. Or the opposite – being so fidgety or restless that you have been moving around a lot more than usual
- 9) Thoughts that you would be better off dead, or of hurting yourself in some way

Appendix I:**Generalized anxiety disorder – 7 (GAD – 7; Spitzer, Kroenke, Williams & Lowe, 2006).**

Over the last 2 weeks, how often have you been bothered by any of the following problems?

Response scale: 0 not at all, 1 several days, 2 more days than not, 3 nearly every day

- 1) Feeling nervous, anxious, or on edge
- 2) Not being able to stop or control worrying
- 3) Worrying too much about different things
- 4) Trouble relaxing
- 5) Being so restless that it's hard to sit still
- 6) Becoming easily annoyed or irritable
- 7) Feeling afraid as if something awful might happen

Appendix J:

Client attachment to therapist scale, secure subscale – adapted (CATS – SA; Mallinckrodt, Gantt & Coble, 1995).

Response scale:

1. I don't get enough emotional support from the program.
2. The program is sensitive to my needs.
3. The program is dependable.
4. I feel that somehow things will work out OK for me when I am using the program
5. The program is not giving me enough attention
6. When I show my feelings the program responds in a helpful way.
7. I don't know what to expect from session to session.
8. I resent having to handle problems on my own when the program could be more helpful.
9. The program helps me to look closely at the frightening or troubling things that have happened to me.
10. The program is a comforting presence to me when I am upset.
11. I know the program will understand the things that bother me.
12. I feel sure that the program will be there if I really need it
13. When I use the program I am its highest priority

NB: Item 20 of the original scale “I know my counsellor enjoys working with me” has been removed.

Appendix K:

Working alliance inventory – short form - adapted (WAI – SA; Horvath & Greenberg, 1989, Tracey & Kokotovic, 1989).

The following questions describe some of the different ways a person might think or feel about the program. Some questions may seem confusing but try to answer as best you can. Please indicate your agreement with each statement.

Response scale: 1 strongly disagree, 2 disagree, 3 somewhat disagree 4 neutral, 5 agree somewhat, 6 agree, 7 strongly agree.

1. The program and I agree about the things I will need to do in therapy to help improve my situation.
2. What I am doing in the program gives me new ways of looking at my problem.
3. I believe the program likes me.
4. The program does not understand what I am trying to accomplish in therapy.
5. I am confident in the programs ability to help me.
6. The program and I are working towards mutually agreed upon goals.
7. I feel that the program appreciates me.
8. The program and I agree on what is important for me to work on.
9. I trust the program.
10. The program and I have different ideas on what my problems are.
11. I have established a good understanding of the kind of changes that would be good for me
12. I believe this way of working on my problems is correct.

Appendix L:**The User Engagement Scale – adapted (O'Brian & Toms, 2010).**

This questionnaire asks about your experience of the self-help program you just completed. Below are statements with which you may disagree or agree. Use the scale to convey your disagreement or agreement with each item.

Response scale; 1, strongly disagree, 2 mostly disagree 3 neutral, 4 mostly agree, 5 strongly agree

1. I lost myself in this experience of the CCBT program.
2. I was so involved in the CCBT program that I lost track of time.
3. I blocked out things around me when I was using the CCBT program.
4. When I was using the CCBT program, I lost track of the world around me.
5. The time I spent on the CCBT program just slipped away.
6. I was absorbed in the CCBT program.
7. During the CCBT program I let myself go.
8. I was really drawn into the CCBT program.
9. I felt involved in the CCBT program.
10. This CCBT experience was fun.
11. I would be curious to explore this CCBT program further.
12. The content of the CCBT program incited my curiosity.
13. I felt interested in the CCBT program.
14. Using the CCBT program was worthwhile.
15. I consider my usage of the CCBT program a success.
16. This CCBT experience did not work out the way I had planned.
17. My CCBT experience was rewarding.
18. I would recommend using the CCBT program to my friends and family if they were experiencing anxiety or depression.

19. This CCBT program is attractive.
20. This CCBT program was aesthetically appealing.
21. I liked the graphics and images used on this CCBT program.
22. This CCBT program appealed to my visual senses.
23. The screen layout of this CCBT program was visually pleasing.
24. I felt frustrated while using this CCBT program.
25. I found this CCBT program confusing to use.
26. I felt annoyed while using this CCBT program.
27. I felt discouraged while using this CCBT program.
28. Using this CCBT program was too mentally taxing.
29. This CCBT experience was too demanding.
30. I felt in control of my CCBT program experience.
31. I could not do some of the things I needed or wanted to do on this CCBT program.

Appendix M:

Security priming instructions

Please think about a relationship you have had in which you have found that it was relatively easy to get close to the other person and you felt comfortable depending on the other person. In this relationship you didn't often worry about being abandoned by the other person and you didn't worry about the other person getting too close to you. It is crucial that the nominated relationship is (or was) important and meaningful to you.

Now, take a moment and try to get a visual image in your mind of this person. What does this person look like? What is it like being with this person? You may want to remember a time you were actually with this person. What would he or she say to you? What would you say in return? How do you feel when you are with this person? How would you feel if they were here with you now?

Please note down your thoughts in the text box below. You will have 10 minutes to do this. If you finish before the 10 minutes are up, please continue to think about the relationship and write down anything else that comes to mind about the relationship. Remember, your responses are anonymous.

Neutral prime instructions

We now want you to complete a visualisation task. We would like you to write for 10 minutes about doing your routine food shopping. Try to think of a particular time you visited the supermarket to do your routine food shopping and give information about the sequence of events that you completed as you moved around the store. For example, you may have selected a trolley and walked down the first aisle, picking up items as you went. Please try to give as much detail as possible about what you picked up or looked at, i.e., did you have to weigh an item or did you reach up to a top shelf?

Please note down your thoughts in the text box below. You will have 10 minutes to do this. If you finish before the 10 minutes are up, please continue to think about that scenario and write down anything else that comes to mind. Remember, your responses are anonymous.

Appendix N:**The Felt Security Scale (Short Version, Luke, Sedikides, & Carnelley, 2012).**

Please respond to the items below using the following 6-point rating scale.

1	2	3	4	5	6
not at all					very much

Thinking about the person I described in the visualization task makes me feel ...

_____ Comforted

_____ Secure

_____ Supported

_____ Safe

_____ Loved

_____ Protected

_____ Better about myself

_____ Encouraged

_____ Sheltered

_____ Unthreatened

Appendix O:
Social Presence Index – adapted (Lee & Nass 2003).

Think about the session you just viewed and answer the following questions. Please be honest in your answers.

Response Scale;

1. Not at all 2. Only a little 3. Some 4. A lot 5. Very much

1. While you were hearing the reviews, how much did you feel as if someone talking to you?
2. How involving was the whole hearing session?
3. While hearing the reviews, how vividly were you able to mentally imagine the source of voice?
4. How much attention did you pay to what was being said?